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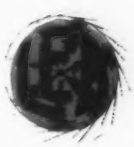

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THOMAS A. TRUMBOUR
*Business Manager*

NATHANIEL HALL and
G. B. HOGABOOM, Jr.
*Associate Editors*

JOAN TRUMBOUR
*Advertising Manager*

*On Leave with the Armed Forces*

Palmer H. Langdon
1st Lt. C. E., U. S. Army

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## CONTENTS

Editorial ... 731

Increased Piston Ring Life By Porous Chromium Plating—By Tracy C. Jarrett and Robert D. Guerke ... 732

Metallizing Non-Conductors—Part IV—By Samuel Wein ... 736

A New Idea in Racking ... 738

Suggestions for Selection of Polishing Wheels—Part IV—By G. A. Lux ... 739

Reclaiming Old Pipe and Tubing By Wire Brushing ... 742

Nitrocellulose ... 777

Testing and Evaluating Finishes at Lockheed—By S. G. Andrews ... 780

Cleaning Air Compressors and Air Receivers ... 784

## DEPARTMENTS

Patents ... 743

This is Washington ... 745

Shop Problems ... 748

New Equipment and Supplies ... 750

Business Items ... 756

Associations and Societies ... 761

Manufacturers' Literature ... 764

News from California ... 765

Obituaries ... 767

Odds and Ends ... 55

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VOL. 42, NO. 12 METAL FINISHING DECEMBER, 1944
PREPARATION, ELECTROPLATING, COATING

# RECONVERSION

Inauguration of the limited civilian goods conversion program by the War Production Board calls for an important decision on the part of the smaller war plant—whether or not to reconvert.

Early reconversion is not always desirable and the timing of a reconversion program is a difficult matter. Several factors must be weighed before a final decision is reached. For instance, prices will, in many cases, be fixed at the 1942 levels, despite increased costs of production. War work may therefore be more profitable than civilian orders and manufacturers will probably desire to avoid contract termination as long as possible. On the other hand, if the contracting agency is willing, the advantages of an early start back to civilian markets may make it worth while to switch to less profitable production.

Cut-backs and complete terminations of war contracts will be based on the following major tests, which should be studied to determine whether there is a possibility of the government stepping in with a cancellation:

1. Firms using the minimum amount of materials and manpower will be the last to be terminated.
2. The lower the price, the better the chances of retaining the government contract.
3. To avoid industrial dislocation, contracts employing an extensive network of subcontractors will be maintained in preference to those using fewer subcontractors.
4. Small firms, which employ 500 workers or less, if reasonably efficient, will be given preference in retaining their contracts—even though they use more manpower and have higher costs than other, larger firms.

Where it seems desirable to make an early shift from war to civilian work, the manufacturer should consult with his contracting officer, who may be glad to relieve him of his contract, particularly where some cut-backs have to be made and his contract is being continued primarily because he has less than 100 employees. Before deciding to reconvert, however, the manufacturer should make certain that labor and materials are available and that there are no restrictions on the use of materials and the volume of end products in his field.

All planning for reconversion, it must not be forgotten, includes plans for maintenance of materials allocation and price ceilings—in short, a price rationing system for materials.

# Increased Piston Ring Life By Porous Chromium Plating

By TRACY C. JARRETT and ROBERT D. GUERKE*

A PISTON ring, the only part on an airplane engine that is still made of cast iron, operates in one of the toughest spots in an engine. In a great majority of cases, the compression rings and especially the top rings operate to a great extent with very little lubrication. This condition, if allowed to continue long, causes considerable ring and cylinder wear. When this condition is severe, the rings feather or scuff and the oil consumption increases beyond the normal for good engine performance. When this undue wear of rings and cylinders takes place, the engine itself cannot operate at top efficiency. The wearing of the rings and cylinder, under extreme dusty conditions is most serious and presents a major problem today. The ideal piston ring is one that will resist wear, will not feather or scuff, and at the same time will not cause cylinder wear.

A porous chromium plating process, originated by H. van der Horst, has made it possible to produce porous chromium wearing surfaces which do resist wear. The porous chromium plate applied to piston rings is entirely different from the usual bright plate used on bumpers, door knobs, etc. It is applied to the cylinder contacting surface of the piston ring and permits the ring to seat itself quickly, without wearing out. The porosity has a tendency to condition the cylinder during this seating in period, the final result being two perfectly mated surfaces. This porous chromium surface, when applied to piston rings, increases the life of the rings approximately five times and reduces the cylinder wear to about one-third of that obtained with unplated rings. These two important advantages have made it possible to increase the time between overhauls and maintain high operating efficiency.

In an aircraft engine, it should be pointed out that only the top ring of each piston is chromium plated and the remaining compression and oil rings are plain gray iron.

Field test data were obtained from different sections of the country and from different types of engines. The following tables show the barrel wear of different types of engines, some using plain cast iron rings in the top groove, and others with porous chromium plated rings in the top groove; the approximate amount of wear on the chromium plated ring; and the hardness of the remaining chromium plate

* Tracy C. Jarrett, Chief Metallurgist. Robert D. Guerke, Chromium Plating Superintendent, Koppers Company, American Hammered Piston Ring Division, Baltimore, Maryland.

Fig. 1. Chromium Plating Room. All plating tanks and operations relating to plating of the rings are kept separate from the generators.

TABLE 1.—WEAR OF CHROMIUM-MOLYBDENUM CYLINDERS RUN WITH POROUS CHROMIUM PLATED RINGS [a]

| Engine No. | Approximate Horse Power | Number Hours Operating Time | Cylinder Wear Measured on Diameter, In. |
|---|---|---|---|
| A | 2,000 | 106 | 0.002 |
| B | 2,000 | 310 | 0.003 |
| C | 2,000 | 460 | 0.002 |
| D | 2,000 | 590 | 0.003 |

[a] Operated under abnormal dust conditions.

TABLE 2.—WEAR OF CHROMIUM-MOLYBDENUM CYLINDERS RUN WITH PLAIN CAST IRON RINGS [b]

| Engine No. | Approximate Horse Power | Number Hours Operating Time | Cylinder Wear Measured on Diameter, In. |
|---|---|---|---|
| E | 2,000 | 70 | 0.006 |
| F | 2,000 | 107 | 0.012 |
| G | 2,000 | 224 | 0.010 |
| H | 2,000 | 301 | 0.016 |

[b] Operated under abnormal dust conditions.

TABLE 3.—WEAR OF POROUS CHROMIUM PLATED RINGS OPERATING AGAINST CHROMIUM-MOLYBDENUM BARRELS

| Engine No. | Approximate Horse Power | Knoop Chromium Plate Hardness[c] | Number Hours Operating Time | Remaining Chromium[d] Thickness, In. | Average Ring Wear |
|---|---|---|---|---|---|
| J | 2,000 | 823 | 68 | 0.004 | 0.001 |
| K | 2,000 | 885 | 108 | 0.003 | 0.002 |
| L | 2,000 | 859 | 315 | 0.0028 | 0.0022 |
| M | 2,000 | 807 | 453 | 0.0018 | 0.0032 |

[c] The hardness of chromium plate was tested on the Tukon tester using a 100-g load and after engine operation. Original hardness before test was 850 to 950.
[d] Average 0.005 in. chromium thickness on the radius originally.

TABLE 4.—WEAR OF NITRIDED CYLINDERS RUN WITH POROUS CHROMIUM PLATED RINGS

| Engine No. | Approximate Horse Power | Number Hours Operating Time | Cylinder Wear |
|---|---|---|---|
| O[e] | 1,200 | 28 | 0.001 |
| P[f] | 1,200 | 593 | 0.000 |

[e] Operated under abnormal dust conditions.
[f] Operated under normal dust conditions.

TABLE 5.—WEAR OF NITRIDED CYLINDERS RUN WITH PLAIN CAST IRON RINGS [g]

| Engine No. | Approximate Horse Power | Number Hours Operating Time | Cylinder Wear |
|---|---|---|---|
| R | 1,200 | 195 | 0.008 |
| S | 1,200 | 559 | 0.010 |

[g] Operated under abnormal dust conditions.

TABLE 6

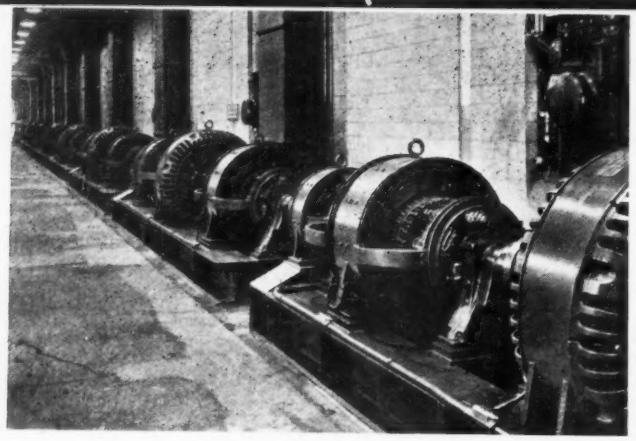
| Engine No. | Approximate Horse Power | Knoop Chromium Plate Hardness[h] | Number Hours Operating Time | Remaining Chromium[i] Thickness, In. | Average Ring Wear |
|---|---|---|---|---|---|
| T | 1,200 | 879 | 150 | 0.0039 | 0.0011 |
| U | 1,200 | 912 | 745 | 0.0040 | 0.001 |

[h] The hardness of chromium plate was tested on the Tukon tester using a 100-g load and after engine operation. Original hardness before test was 850 to 950.
[i] Average 0.005 in. chromium thickness on the radius originally.

A typical specification for a chromium plated aircraft ring calls for a plate thickness of .004" to .006" on the cylinder contacting surface, a depth of porosity of .0007" to .0015", hardness of the plate of not less than 775 Knoop hardness numbers and a microinch finish on the plated surface of 80 to 90 R.M.S. with a uniform appearance.

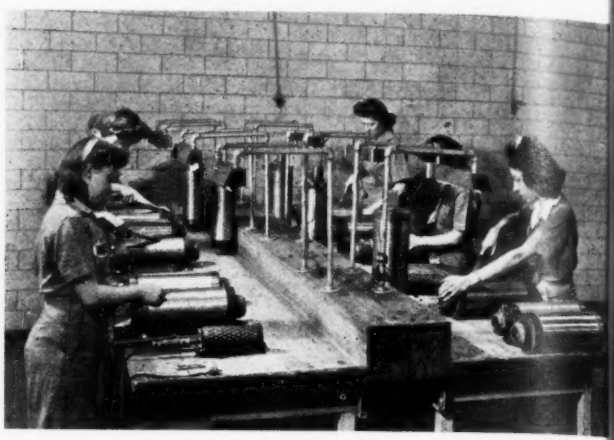
In the process of plating the rings, great care must be exercised at all times first in preparing the work for plating and second in the maintenance of the plating solutions. Analyses of the solutions are made each day to determine the total chromic acid content, the trivalent, the amount of iron present, hexvalent content, and sulphate ratio.

The plating room, shown in Figure 1, uses filtered air to insure a complete absence from dust, and the room is kept



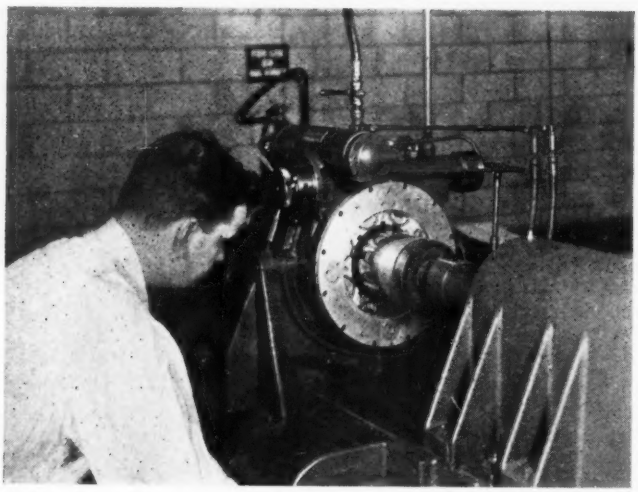
(Left) Fig. 2. Chromium Plating Generator Room. Showing twin gen
erators and exhaust stacks for chromium plating tanks.

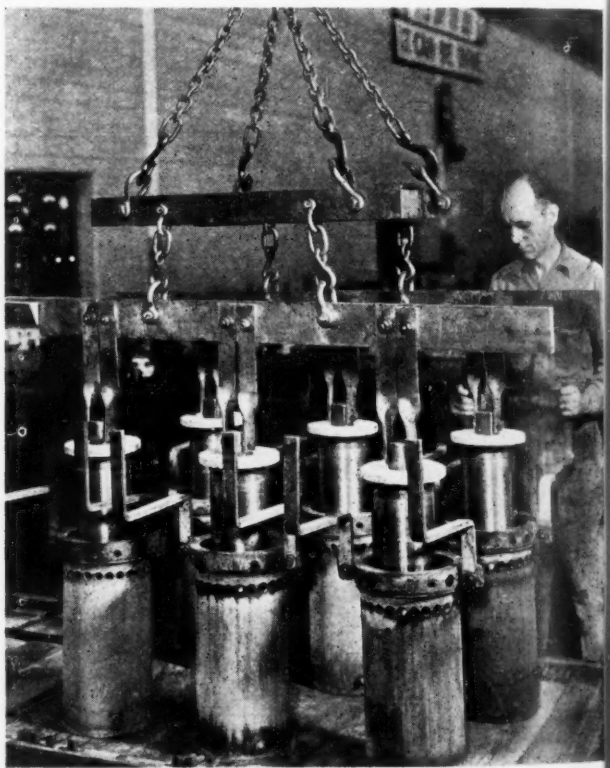
(Below) Fig. 3. Preparing arbors of piston rings for plating. The gap
at the joints of the rings are filled with lead to prepare them for plat
ing. Arbors hold approximately 100 rings.

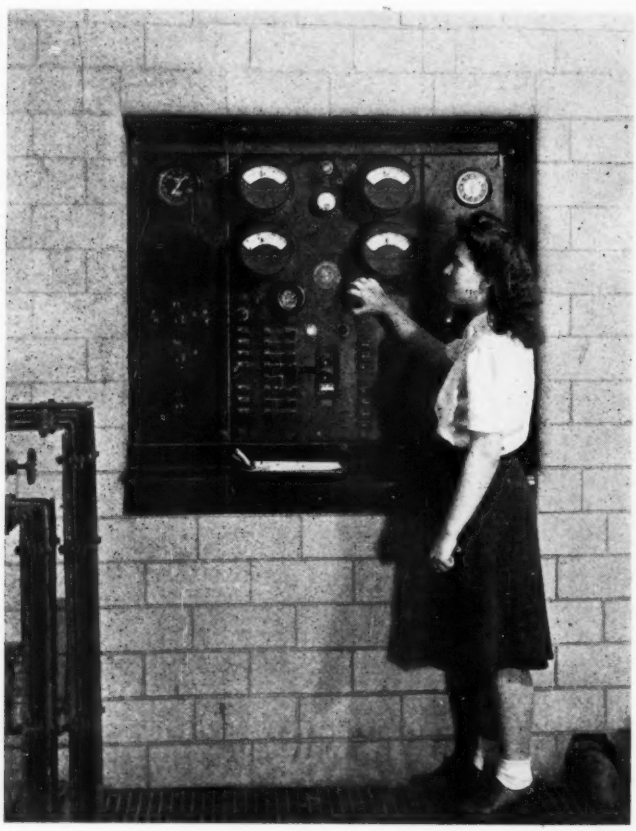


(Left) Fig. 4. Automatic honing of arbors of rings. The rings are hone
to a micro-inch finish of 10 R.M.S. or less to remove all surface defect

(Below) Fig. 5. Assembly of arbors of piston rings in anodes. Top spacer
and anode pins keep the arbors in perfect alignment and parallel t
anode walls.

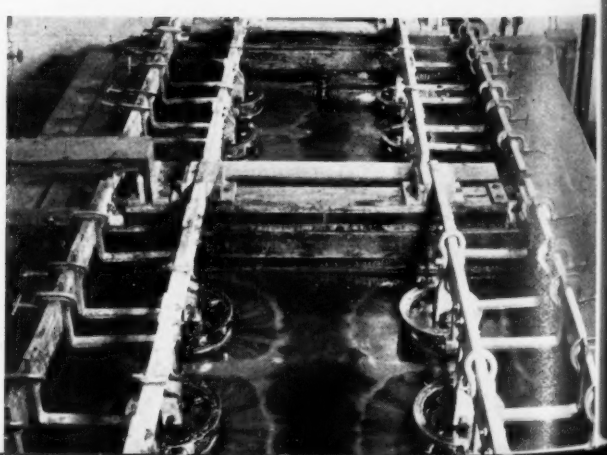






(Above) Fig. 6. Control Panel Board. This panel board permits the operators to maintain accurate control over the tank during the entire plating cycle.

(Right) Fig. 7. Chromium Plating arbors of piston rings. Twelve arbors can be plated at the same time.



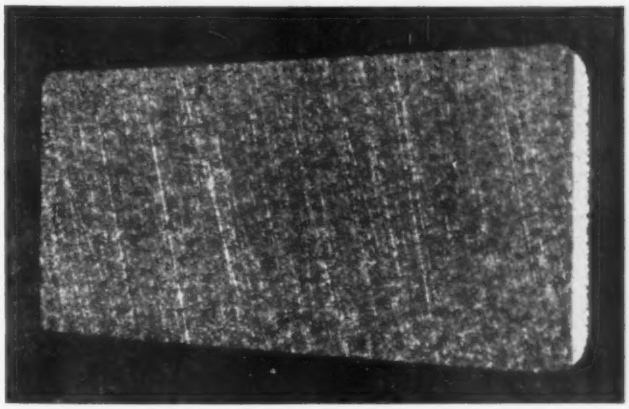
under pressure to keep outside air which may be laden with dust from entering. The air is changed every two minutes to keep any possible fumes from coming in contact with the workers, although the chromium plating tanks have their own individual exhaust systems. All of the tanks are set in a deep pit, which is well drained, and any acid or water coming from cleaning the anodes or arbors drains into the pit. This helps to preserve the dust-proof floor from the attack of acids. Tile walls aid in keeping the room clean and bright as any acid that might come in contact with the walls may be easily removed.

The generators (Fig. 2) are in a separate air filtered room. The filtering of the air increases the life of the generators considerably. The power for each tank is supplied by two 4,000 ampere, 12 volt generators, with common excitation driven by one 150 horse power motor. By having two generators on one set, it is possible to operate the two halves of a tank with two different sizes or types of articles.

Before plating, piston rings are loaded on arbors which contain about 100 rings and, in order to obtain a uniform plate, continuous contact must be maintained which is accomplished by filling the gaps at the ring joints with lead (Fig. 3). This assures a uniform plate around the ring and up to the end of the joint. The arbors of rings are honed before plating to provide smooth surfaces for plating —the better the surface the more uniform the final plate (Fig. 4).

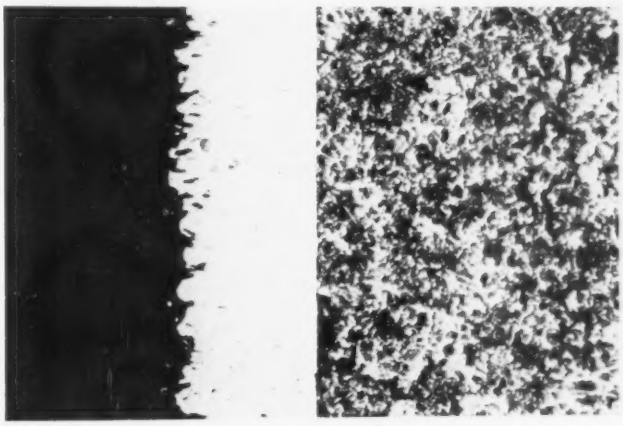
The finish-honed arbor is then made ready for plating by protecting the collars of the arbors, cleaning the rings by wiping with carbon tetrachloride, assembling the arbors on bus bars, and placing them in anodes (Fig. 5). The centering of the arbor in the anode is important, as the sides of the arbor should be parallel to the sides of the anode. Porcelain spacers and pins are used to keep the arbor centered in the anode.

Fig. 8. All rings are carefully inspected after plating.



(Above) Fig. 9. Porous-Chromium-Plated Cast Iron Ring Showing Blending of Radius 25 X.

(Below) Fig. 10. Cross-Section of Porous-Chromium Plated Cast Iron Piston Ring Nital Etch—100 X.



An assembly of six arbors is placed in the plating tank, the operator then starts the plating cycle. The panel board, shown in Figure 6, permits exact control through the use of ammeters and voltmeters with indicator lights, making it possible to tell at a glance the plating condition of the arbors and tanks. When all of the arbors are plating properly, a very heavy flow of gas occurs around each arbor and anode assembly, as shown in Figure 7, where 12 arbors are being plated at one time. Each half of the tank operates from one of the 4,000 ampere generators. This dividing of the tanks makes it possible to do more than one size arbor at a time, as previously mentioned.

After the rings are plated they are separated from each other and then the O.D. edges are carefully radiused. The rings, after radiusing, are inspected for any possible defects that may be present (Fig. 8). Samples for each lot are checked for depth of porosity, hardness of plate, and plate thickness. The plate thickness measurements act as a check on the operator who measures the arbors before and after plating. The finished porous chromium plated ring is shown in Figure 9, and a cross-section of the porosity and plate in Figure 10.

# Metallizing Non-Conductors

By SAMUEL WEIN

*New York, N. Y.*

## PART IV

*Stock Solution "D"*

| | |
|---|---|
| Water | 100 cc. |
| Potassium hydroxide | 10 g. |

The silvering solution is prepared as previously described in the coating of Plexiglas.

Gurwood recommends the following cold silvering solution:

| | |
|---|---|
| Dextrose | 2% |
| Alcohol | 4% |
| Tartaric acid | 1% |
| Water | 93% |

All percentages are by weight.

Newton plates celluloid frames by first silvering the surface and then depositing a thin film of copper, after which other metals can be plated for finishing purposes. His method consists in the preparation of three solutions, and, these are:

*Solution No. 1*

| | |
|---|---|
| Water | ½ pt. |
| Silver nitrate | ½ oz. |

*Solution No. 2*

| | |
|---|---|
| Caustic potash | 2 oz. |
| Water | ½ pt. |

*Solution No. 3*

| | |
|---|---|
| Grape sugar | 8 oz. |
| Water | 16 " |
| Tartaric acid | 1 " |
| Alcohol | ¼ " |

Take equal portions of solutions 1 and 2 and add enough ammonia to precipitate the silver. Shake well and add 1/3 the quantity of Solution 3. This mixture is now poured onto the celluloid surface to form the silver film.

### *Rochelle Salt Process*

The Rochelle Salt Process was invented by Petitjean in 1855 and is the foundation of most all of the processes commonly used today, although it is known by various other names. Two solutions were used in this process.

| | | |
|---|---|---|
| "A" | Silver nitrate | 16.6 g. |
| | Water | 100.0 cc. |

This solution was made by dissolving the silver nitrate in half of the water, adding ammonium hydroxyde until the precipitate first formed had nearly redissolved, and then making the total up to 100 cc.

| | | |
|---|---|---|
| "B" | Tartaric acid | 1.21 g. |
| | Water | 100.0 cc. |

Equal parts of Solutions "A" and the reducing Solution "B" are mixed and poured onto the surface to be silvered.

Draper's process is essentially a modification of Petitjean's process, in which Rochelle salt (sodium-potassium tartrate) is used instead of tartaric acid as the reducing solution.

The following formulation is suggested by Gardner and Case:

| | | |
|---|---|---|
| "A" | Water | 1 liter |
| | Silver nitrate | 2 g. |
| | Rochelle salt | 1.7 " |

The solution of silver nitrate in water, is heated to the boiling point and the Rochelle salt added, after which it is stirred while boiling for five minutes. And filtered before cooling. It is stored in a dark bottle.

| | | |
|---|---|---|
| "B" | Water | 100 ml. |
| | Silver nitrate | 10 g. |

Ammonia is added until the precipitate which first forms just redissolves (about 10 ml. is required). A 10% silver nitrate solution is then added until a permanent darkening occurs. Dilute to one liter. Equal volumes of reducer and silver solution are used.

Although the Rochelle salt formula is usually recommended for silvering in hot solutions, it will be found that, provided the procedure already described for priming is followed, good results are obtained with cold solutions. If the stannous chloride priming is omitted in this case, no silvering occurs in this solution in the cold.

### *Formaldehyde Process*

Gardner and Case are credited with the following formaldehyde formulation and procedure for silver.

*The Reducing Solution*

| | |
|---|---|
| Water | 6.76 oz. |
| Formaldehyde | 1.35 " |

*The Silver Solution*

| | | |
|---|---|---|
| "A" | Silver Nitrate | .71 oz. |
| | Water | 33.81 " |
| "B" | Silver nitrate | .07 " |
| | Water | 3.38 " |

Concentrated ammonia is added to Solution "A" in quantities just sufficient to redissolve the precipitate first formed, after which the Solution "B" is added until a slight cloud forms. If the specific gravity of the ammonia is 0.90, approximately 0.6 ounces will be required for the above amount.

For silvering, 5 parts of the silver nitrate solution are mixed with 1 part of reducing solution immediately before application to the surface to be silvered. The silvering proceeds well at a temperature of approximately 68° F.

Hepburn suggests the following stock solutions:

Solution "A" reducing compound, dilute 50 cc. of a 40% formaldehyde solution to 1 litre
Solution "B" silver nitrate, and
Solution "C" ammonia as in the case of the cane sugar formula.

For use, add 10 cc. of Solution "A" to each 10 cc. of the silver nitrate solution, after preparation of the ammoniacal solution as described above. Note that potassium hydroxide is omitted in this case.

Another fairly popular process credited to Colton is made up of:

| | |
|---|---|
| Silver nitrate | 15 g. |
| Water | 500 cc. |

Add ammonium hydroxide until the precipitate formed just about redissolves. The solution is diluted to 1 liter and the temperature noted.

The amount of formaldehyde to use is ascertained by placing 18 drops in a glass container and adding 15 cc. of the silver solution. During a period of one minute the mixture should turn rose, violet, blue, grey and finally deposit a metallic silver film. If it stops short of depositing the film, insufficient formaldehyde has been used. If an excess of formaldehyde is employed, the film is produced but is non-adherent. After determining, in this manner, the proportions to use, the article to be silvered is cleaned well, placed in a suitable vessel, and covered with a a fresh mixture of the silver solution and formaldehyde solution in the proportions determined upon. The temperature is maintained the same as during the tests.

Weiss has developed the following process for plating plastics.

The plastic buttons are tumbled in water and sand mixture at 60 to 79 r.p.m. in order to give them an etched surface. They are then rinsed in running water and thereafter immersed in a 1% solution of iron sulphate for 15 minutes. Subsequently the pieces so treated are transferred to a 2% copper sulphate solution for 3 minutes at 30° C. The activating solution is made up of:

| | |
|---|---|
| Water | 800 cc. |
| Ethyl alcohol | 200 " |
| Sulphuric acid | 5 " |
| Quinol | 15 g. |
| Tin sulphate | 30 " |

for 45 minutes, rinsed well in running water

and a film of silver is deposited from a solution made up of:

| | |
|---|---|
| Caustic soda | 10 g. |
| Silver nitrate | 20 " |
| Ammonia | 50 cc. |

This latter solution is treated with a reducing agent which may be one of the following compounds:

| | |
|---|---|
| (A) Formaldehyde (37%) | 175 cc./gal. |
| (B) Sugar | 90 g. |
| Nitric acid | 4 cc. |
| Water | 1 L. |

Wax may be silvered according to Blackidge by using:

*Solution 1*

| | |
|---|---|
| Silver nitrate | 20 g. |
| Water | 1 oz. |

*Solution 2*

Add ammonia till the precipitate just redissolves.

*Solution 3*

| | |
|---|---|
| Formaldehyde | 1 oz. |
| Water | 3 " |

The wax is treated with this solution, washed and it is ready for plating.

A number of patents were issued to Peacock covering silvering formulas and equipment for their application.

***Other Silvering Processes***

Mario heats etched glass with

*Solution No. 1*

Silver nitrate . . 10% by wt. in alcohol

Solution No. 1 is allowed to dry on the work which is then treated in:

*Solution No. 2*

1% Formic acid (sodium, potassium or ammonium formate) by weight.

The piece so treated is then scratch brushed using a brass wire brush and is dipped in a warm solution (90 to 100° F.) of silver cyanide containing at least 3 oz. metallic silver per quart of water, for 1 to 2 minutes. The surface now has a more pronounced silver film. It is washed with water and is ready for copper plating.

Tryon uses organic reducing agents for forming silver mirrors, herewith are four typical methods given.

*Example I*

Into a vessel introduce 40 parts of 0.4 molar aqueous silver nitrate solution, 20 parts of 15 molar aqueous ammonia, and 0.4 part of tris(hydroxymethyl) nitromethane. To this resulting aqueous mixture, which consists principally of diammine-silver nitrate [$Ag(NH_3)_2NO_3$] and tris(hydroxymethyl) nitromethane is then added at a temperature of about 30° C., with continuous stirring, 10 parts of 2 molar aqueous sodium hydroxide. During the addition of the aqueous sodium hydroxide solution, a bright silver mirror surface is formed upon the walls of the vessel, the mirror attaining its maximum degree of brilliancy shortly after the entire quantity of the sodium hydroxide solution had been added.

*Example II*

A bright silvered reflecting surface was prepared in the same manner as described in Example I, by employing a solution consisting of 1.3 parts of 3-nitro-4-heptanol, 30 parts of ethyl alcohol and 10 parts of 4 molar aqueous ammonia, in place of the tris(hydroxymethyl) nitromethane and 15 molar aqueous ammonia specified in Example I.

*Example III*

A homogeneous solution containing 40 parts of 0.4 molar aqueous silver nitrate, 10 parts of 4 molar aqueous ammonia and 1.2 parts of 2-nitro-2-ethyl-1,3-propanediol was prepared, after which 40 parts of 0.5 molar aqueous barium hydroxide was added thereto, with agitation. During the addition of the barium hydroxide, which was carried out at room temperature, deposition of silver on the walls of the containing vessel was observed. The mirror thus formed reached its maximum state of brilliancy approximately three minutes after the barium hydroxide solution was introduced.

*Example IV*

Forty parts of a 0.4 molar aqueous silver nitrate solution and 0.6 part of 2-nitro-2-ethyl-1.3-propanediol were mixed. To this resulting solution was added 2.4 parts of 2-aminobutane. During the addition of the 2-aminobutane, the mixture was thoroughly agitated and maintained at a temperature of about 29° C. Approximately 15 minutes after all the 2-aminobutane had been introduced, a bright silver mirror appeared on the vessel walls.

Gavrilov treats the object with a tin chloride solution for 5 to 7 minutes, then washes it, and silvers it three times with a 10 g./L. silver nitrate solution in the presence of pyrogallol-3.5, and citric acid-2 g./L.; washing and then treating in a solution of 30 g./L. of sodium sulphate for 1 to 2 minutes. To further improve the coating and to increase its strength, it is treated with Vienna lime in a 3% caustic soda solution and then with a 1% solution of potassium cyanide.

Meltsner forms mirrors without the use of strong alkalies and the customary tartrates, employing instead an amino-alcohol. Typical illustrations of the invention are:

*Example 1*

A silver nitrate solution having a concentration of about 0.1 normal is added to about 20 parts of water. The solution thus obtained is then heated in the neighborhood of 80-90° C., to which there is added about 4 parts of triethanolamine in solution having a strength of about 0.3 molar. Heating of the composition thus obtained in contact with an object to be coated results in the formation of a silvered mirror surface in about two minutes.

*Example 2*

A silver sulphate solution of a concentration of about 0.02 molar and in a quantity of about 30 parts is heated to a temperature in the neighborhood of 80° C. To the heated solution there is added about 5 parts of triethanolamine, concentration 0.3 molar, and heating continued in contact with the material to be silvered, with resulting formation of a mirror in a period of several minutes.

*Example 3*

To about 10 parts of a solution of silver nitrate of a concentration about 0.1 normal, there is added about 2 to 4 parts of monoethanolamine. The reaction mass so produced may then be warmed to a temperature of about 80° C. in contact with the object to be silvered, whereupon a mirror forms in a period of a few minutes.

With some plastic materials it is possible to precipitate a film of silver directly on the work by immersing the work in a heated silver solution, without the usual external reducers. The method is only successful, however, with certain plastics of the Bakelite series, that is, phenol-formaldehyde products, because there is a residual amount of formalyehyde present in the plastic surface and therefore direct reduction can take place. It is possible that this technique can be enlarged upon by incorporating a compatable reducing agent into the raw material mix that is being fed to the molds. This would result in a considerable simplification of the process.

The phenol-formaldehyde plastic material according to Ow-Eschingen is treated with a compound consisting of:

| | |
|---|---|
| Hydroquinone | 4 parts |
| Pyrocatechin | 1 part |
| Acetone | 100 parts |

from 3 to 5 minutes, is well dried, and then placed in a 2% solution of silver nitrate, heated to about 80° C. A firmly adhering film of metallic silver will be found on the surface of the plastic.

In the case of urea types of plastics, a 4 to 5% solution of hydroquinone heated to about 90° C. for about 2 minutes. The plastic material is dried and then immersed for 1 to 2 minutes in a 2% solution of silver nitrate at 80 to 90° C.

Hogaboom and Hall suggest immersing Bakelite in the following solution:

| | |
|---|---|
| Silver oxide | 1 oz. |
| Ammonia | 155 cc. |
| Water | 1 gal. |

The object is allowed to dry for about 3 to 4 hours, and the surplus silver oxide removed with a fine camel's hair brush, and it is then placed in an acid copper sulphate bath. It is claimed that the formaldehyde in the Bakelite will reduce the silver oxide and hence no reducing agent is needed as in the case of silvering glass or similar materials.

Warren forms a "paste" of the following:

| | |
|---|---|
| Silver nitrate | 10 g. |
| Acetate sufficient to form a saturated solution, thereafter add | |
| Silver powder | 50 " |

This paste is applied to the surface of cellulose acetate and, after the acetone has evaporated from the surface, the excess material is removed as by wiping it off. This silvered surface is now exposed to the vapors of formaldehyde in a closed vessel, so as to effect reduction of the silver nitrate. The surface will appear dull and non-metallic, requiring burnishing to produce a flat and

highly conductive non-porous film, which can easily be plated.

Freund and Deutsch make a 20% solution of cellulose acetate in acetone and to this is added in such proportion that the solution contains 6 to 7 parts of silver nitrate to 100 parts of cellulose acetate. This solution is now formed into a sheet as by casting. By treatment of such a sheet with an aqueous reducing solution containing 0.25% sodium carbonate, 0.2% formaldehyde and a mixture of ethyl alcohol and acetone, there will result a silvery film on the entire sheet surface.

A modification consists of a sufficient quantity of silver nitrate dissolved in 80% aqueous ethyl alcohol, added to a 15% solution of ethyl cellulose in a binary solvent consisting of 75% ethyl alcohol and 25% toluene, so that the solution contains about 6 to 8 parts of silver nitrate to 100 parts of ethyl cellulose. This may be cast into sheet form, and treated with a reducing solution at 45° C. containing 0.2% formaldehyde, 0.25% sodium carbonate and a little ethyl alcohol as a swelling agent.

Mechanical methods and devices for plating silvered glass surfaces for reflectors were patented by Scherling, Schwabe, Cowper-Coles, Halvorsen, Bart, Hitchcock, Guay, Jones and Kuchmair.

Silvering solutions may be "sprayed" onto the given surface much in the same manner as in paint or lacquer spraying. In such methods the "gun" has two orifices, to accommodate the silvering and the reducing solutions, which are ejected into the air in the form of a more or less disperse spray. Several designs exist according to Bart, Schneider and Peacock, where the solutions are mixed either before or shortly after the nozzles, both designs are directed onto the surface to be coated.

### *References*


Bart, B., U. S. Pat. No. 1,503,743 (Aug. 5, 1924); U. S. Pat. No. 1,560,032 (Nov. 3, 1925); U. S. Pat. No. 1,574,544 (Feb. 23, 1926); U. S. Pat. No. 1,583,268 (May 4, 1926); U. S. Pat. No. 1,587,268 (July 1, 1926); U. S. Pat. No. 1,593,988 (June 1, 1926).

Bartol, W. F., U. S. Pat. No. 2,273,613 (Feb. 17, 1942); Metal Finishing, **39,** 668 (1941).

Baum, F., Chem. Zeit., **53,** 354 (1929).

Blacklidge, C. F., U. S. Pat. No. 799,218 (Sept. 12, 1905).

Boirre, C., U. S. Pat. No. 28,605 (May 12, 1910).

Brashear, English Mech., **31,** 237 (1880).

Colton, M. A., Rev. d'Opt., **3,** 57 (1924).

Coles-Cowper, S. O.,-British Pat. No. 2396 (Aug. 3, 1909); U. S. Pat. No. 602,306 (Apr. 12, 1898).

Draper, Smithsonian Contrib. To Knowledge, **34,** 5.

Dupuis, J., U. S. Pat. No. 2,351,940 (June 20, 1944).

Fafet, F., Jour. Soc. Chem. Ind., **17,** 154 (1898).

Freund, E., U. S. Pat. No. 2,063,034 (Dec. 8, 1936).

Freund, E. and Deutsch, F., U. S. Pat. No. 2,186,452 (Jan. 9, 1940).

Gardner, I. C. and Case, F. A., Bur. Stand. Circ. No. 389, Jan., 1931.

Gavrilov, P. V., Chem. Zentrbl., p. 1222 (1941); Chem. Abst., p. 6419 (1942).

Guay, E. J., U. S. Pat. No. 1,523,015 (Jan. 13, 1925).

Gurwood, A. G., U. S. Pat. No. 2,239,519 (Apr. 22, 1941).

Halvorson, C. A. B., British Pat. No. 1535 (Apr. 28, 1925); U. S. Pat. No. 1,394,085 (Oct. 18, 1921).

Hepburn, J. R. I., Metal Finishing, **39,** 603 (1941).

Hitchcock, H. K., U. S. Pat. No. 1,603,951 (Oct. 19, 1926); U. S. Pat. No. 1,488,923 (Apr. 1, 1924).

Hogaboom, Jr. G. B. and Hall, N., Plating & Finishing Guidebook, p. 79 (1941).

Jones, F. L. and Guchmair, R. J., U. S. Pat. No. 2,135,873 (Nov. 8, 1938).

Laval, C. A., U. S. Pat. No. 184,632 (Nov. 1876); U. S. Pat. No. 368,839 (Aug. 23, 188

Lenoir, J. J., U. S. Pat. No. 166,790 (Aug. 1875).

Macchia, O., Chem. News, **135,** 197 (1927).

Marino, P., U. S. Pat. No. 925,365 (June 15, 1

U. S. Pat. No. 1,041,126 (Oct. 15, 1912); U

Pat. No. 1,096,177 (May 12, 1914); U. S.

No. 1,452,281 (Apr. 17, 1923).

Meltsner, M., U. S. Pat. No. 1,989,764 (Feb. 1935).

Majumdar, V. D., Science & Culture, **7,** 270 (1

Newt, G. S., Chem. Lecture Exper., p. 325.

Newton, E. E., Metal Industry, **3,** 221 (1

Metal Industry, **4,** 111 (1906).

Ow-Eschingen, U. S. Pat. No. 2,010,805 (Aug. 1935).

Passuit, Battelle Memorial Inst., Mar., 19

Peacock, Wm., Jr., U. S. Pat. No. 1,736,667 (N

19, 1929); U. S. Pat. No. 1,935,520 (Nov. 14, 19

U. S. Pat. No. 1,988,663 (Jan. 22, 1935); U

Pat. No. 2,214,476 (Sept. 10, 1940); Canadian

No. 348,131 (Feb. 12, 1935).

Petitjean, T., British Pat. No. 1681 (July 1855); U. S. Pat. No. 15,950 (Oct. 21, 1856).

Schneider, H., U. S. Pat. No. 2,136,024 (Nov. 1938).

Sherling, J. H., U. S. Pat. No. 505,576 (Sept. 1893).

Schwabe, C., U. S. Pat. No. 581,775 (May 1897).

Silverman A. and Howe, Ind. Eng. Chem., 1032 (1917).

Silverman, A. and Neckerman, American Cera Soc., **17,** 505 (1915).

Smith, R. D., U. S. Pat. No. 1,999,529 (Apr. 1935); U. S. Pat. No. 2,075,477 (Mar. 30, 19

U. S. Pat. No. 2,103,598 (Dec. 28, 1937).

Tryon, P. F., U. S. Pat. No. 2,315,141 (Mar. 1943).

VonLiebig, J., U. S. Pat. No. 33,721 (Nov. 1861).

VonWartenberg, Zeit. Anorg. Chem., **190,** (1930).

Waitz, R., U. S. Pat. No. 22,186 (Mar. 2, 18

Walker, B., U. S. Pat. No. 2,214,646 (Sept. 1940); U. S. Pat. No. 2,303,871 (Dec. 1, 194

Warren, A. I. G., U. S. Pat. No. 1,527,241 (F 24, 1925); U. S. Pat. No. 1,834,812 (Dec. 1, 19

Weiss, M., U. S. Pat. No. 2,355,933 (Aug. 15, 19


# A NEW IDEA IN RACKING

A NEW type plating rack developed by Frank Rohr of the Finishing and Plating Department is today saving untold manhours in the handling of small aircraft parts at The Glenn L. Martin Company, Baltimore, Maryland.

Extremely simple in construction, the new rack does away with the individual hanging of numerous small parts and at the same time insures that the surface to be plated faces the anode, thus guaranteeing uniformity of metal deposit and cutting down on rejects due to uneven coating. A further advantage is that they provide a safe, efficient means for draining parts as they are removed from the baths while protecting the operator's hands and clothing from the caus solutions.

A girl operator loads small aircraft parts into the new type plating rack.

The basic design of the rack consists o tubular metal framework across which w mesh is stretched in the manner of an fashioned bed spring. Some of the fra are covered with chicken wire and oth with a larger mesh material to accommod various size parts. The mesh covered fra is attached to another piece by two a with pivots slightly above mid point so t it can be easily tilted in either direction.

In use parts are placed in the frame slipping the ends through the wire m where they are held in place by the nat pressure of the wire. Parts which do adapt to this procedure can be hung on rack with small wire hooks. It has b estimated that use of the new racks has loading time in half, since the previ method required the individual hanging each part.

When the rack is loaded, it is picked by the top bar with an overhead conve and carried to the plating bath where i tilted to either side to insure complete dr age, and then carried to the point wh the plated parts are unloaded. Through the whole operation it is unnecessary for operator's hands or clothes to come in con with the plating solution at any time.

The Martin Company is now using th racks in its own finishing and plating partment and is prepared to license th manufacture for industry wide use.

# Suggestions for Selection of Polishing Wheels

By G. A. LUX*

*Divine Brothers Company, Inc., Utica, New York*

PART IV

THE importance of polishing wheel dimensions (diameter, face width, and arbor hole diameter) was discussed in Part I (Jan. 1944) of this series. The definition, limitations and scope of polishing, and recommended nominal peripheral speed for polishing operations were also presented at that time. Part III (May 1944) considered the balancing, preparation, "heading", "drying" and "breaking up" or "cracking" of polishing wheels, with special reference to the use of glue for bonding the abrasive grain to the polishing wheel face.

Part IV of this series is intended to describe the various types of commercial polishing wheels, the materials from which they are constructed, their special characteristics, and some of the types of polishing operations in which they find application. It is recognized that this information can serve only as a general guide to the selection of polishing wheels for specific operations.

### *Comparison of Polishing and Grinding*

Grinding is a precision, metal-removing operation. This is due to the nature of the wheels used and, to some extent, the equipment used to apply objects to the action of a grinding wheel. Grinding wheels are made from mixtures of abrasive grains and vitreous or resin binders. The mixtures, after being molded to shape, are "fired" or "cured" to produce the hard, unyielding, solid grinding wheels of commerce. A rotating grinding wheel can not adapt its face contours to an object applied to it. The abrasive grains of the grinding wheel actually adapt the surface of the object to the contours of the wheel face by removal of material. Application of this metal-removing principle is one of the major machining operations. Grinding offers the advantages of an efficient means for obtaining precision metal removal and controlled surface finish on objects. It is incidental that a "ground" surface is also pleasing to the eye.

The fields of grinding and flexible wheel polishing overlap to some extent, but each has a definite place in industry and they can not be considered competitive in any large sense. Polishing finds its industrial application in the smoothing of metal surfaces to produce pleasing finishes. It removes metal, as grinding does, but this metal removal is generally considered a means to obtain a polished surface, rather than a precision machining operation.

A rotating polishing wheel, unlike a grinding wheel, possesses a degree of flexibility or resiliency that enables it to conform or adapt itself to the major contours of a surface applied to its face. This property of a polishing wheel does not alter the abrasive characteristics of the polishing grains attached to its periphery. Thus, a polishing wheel, *properly used*, can remove the minor irregularities in the surface of an object without changing its major contours. (Obviously, continued application of a surface of an object to a rotating polishing wheel would result in a surafce similar to that produced by a grinding wheel.)

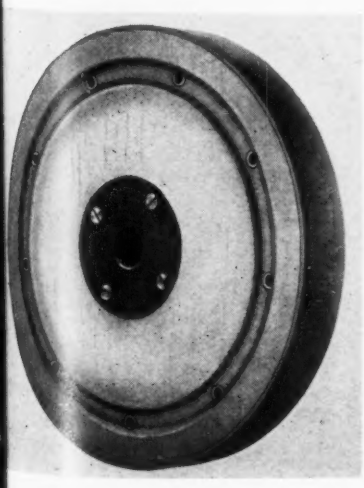
### *Polishing Wheel Hardness or Density*

The flexibility, resiliency or degree of hardness of a polishing wheel is designated as its *density* in the trade. Thus, a polishing wheel may be said to have a "soft", "medium", or "hard" density or an intermediate or extreme density such as "medium soft", "medium hard", "super soft" or "extra hard". Polishing wheel manufacturers have definite factory procedures for producing each type of wheel in a range of densities by control and selection of materials, quantities used and methods of fabrication. Because natural materials such as fabrics, leathers, wood and glue (all subject to variations and affected by atmospheric conditions) are used in the construction of polishing wheels, control of density is a major manufacturing problem.

No instrument, similar to the asphalt industry's Penetrometer or the rubber industry's Durometer, has been developed to measure quantitatively the density or hardness of polishing wheels. However, polishing wheel manufacturers can build a number of wheels having identical density within very narrow limits or they can duplicate the density of wheels made years apart. This uniformity is possible only through exacting material and manufacturing control based on many years' experience.

Discussion of polishing wheel densities is made difficult by the fact that the terms "soft", "medium" or "hard" as used in the trade are only relative. They serve only to distinguish the variation in hardness and resiliency between wheels of the same material and type of construction. Thus, a *soft* bull neck leather polishing wheel can not be substituted for a *soft* cloth pol-

*Present Address: c/o Oakite Products, Inc., New York, N. Y.



1. Leather-Covered Wood Polishing Wheel.

Fig. 2. Bullneck Leather Polishing Wheel.

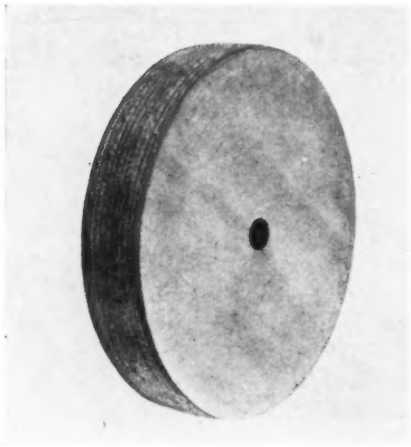


Fig. 3. Canvas Solid Glued Polishing Wheel.

ishing wheel, if equivalent polishing performance is desired.

Experience has shown that each type of polishing wheel has an inherent degree of hardness, flexibility and resiliency that imparts performance characteristics peculiar to it. As stated in Part II (April 1944) with reference to the effects of the various sewings of buffs; an experienced operator can recognize these characteristics by the "feel" of the wheel on which he is working, but finds it difficult to describe or evaluate them, except in terms of performance. Skilled polishers have learned to associate efficient polishing of various shapes and materials with a certain "feel" and have demanded polishing wheels to provide this vaguely described quality. In their attempts to meet these requirements, polishing wheel manufacturers have utilized many materials and developed many types of wheel constructions. Some have received wide acceptance and others have found but limited application. There are very few polishing operations whose satisfactory performance is limited to use of one certain type of wheel and density, despite opinions to the contrary. It should be remembered that *selection* of polishing wheels and their densities is dependent, in large extent, on individual, personal preferences, the result of experience. Progressive polishing wheel manufacturers prefer to have such selection on a more exact basis. The services of their engineers and finishing data files are available on request for solving polishing problems.

### *Types of Polishing Wheels and Their Application*

*Leather-Covered Wood Polishing Wheels* (Figure 1)—An older style polishing wheel that still finds some application in the fine polishing of flat work (door plates, name plates) and parts on which sharp edges, corners or bevels must be maintained (chisels, shears, small arms parts). This wheel closely approaches the solid grinding wheel in hardness. It is made by gluing and pegging a uniformly thick strip of selected back leather to the face of a laminated wood wheel. The thin cushion of leather on its periphery imparts the small degree of resiliency that operators require, but does not offset the effect of the solid wooden core. Varying the thickness and quality of the leather strip or using double leather strips permit some modification in density. Present day improvements include constructions intended to minimize warping, metal hubs for truer running and balancing tubes for safe, easy balancing.

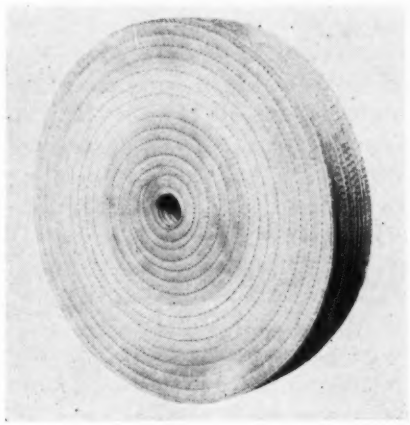


Fig. 4. Clothflex Solid Glued Polishing Wheel.

*Leather Disc Polishing Wheels* (Figure 2)—Discs of selected leather are cemented together to form polishing wheels with characteristic properties inherent to the type of leather and construction. In general, leather disc wheels are used for fine finishing, usually with fine abrasive heads and oil or grease for final "oiling out" or "greasing out" operations. Polishing wheels made by gluing or cementing *Bullneck Leather* discs together withstand hard service. They are used in finishing stove parts, hardened steel tools, flat forgings and some brass parts. *Walrus Hide Polishing Wheels* are available in single disc construction up to 1-½" in thickness. Over that thickness, two or more discs are cemented together. Walrus hide has a porous, open grain that enables it to impart a unique degree of toughness and resiliency that can not be duplicated in any other type of wheel. For production of high quality finishes on hardened steel parts in the cutlery, fine tools and small arms trades, it is without equal. The jewelry industry uses small walrus hide wheels for "bobbing" operations. Here, the wheels are not "set up" with glue and abrasives. Oil treated or moistened fine abrasives are forced into the porous open face of the wheel by applying the loose abrasive to the wheel with the part being polished. *Full Disc Sheepskin Polishing Wheels* are made by either cementing individual full discs together or cementing groups of sewed sections of the disc together. The flexibility and softness of sheepskin wheels make them particularly useful in fine finishing of soft metals and jewelry.

*Canvas Disc Polishing Wheels* (Figure 3)—These wheels are generally used with coarse abrasive heads for heavy "roughing out" polishing operations on castings and forgings. They find wide use in the initial or coarse polishing of agricultural implements, stove parts, wrenches, automobile bumpers and brass plumbing goods. The open weave of the canvas used in their manufacture provides a firm anchorage for coarse abrasive grain heads and thus canvas wheels are recommended for removing heavy burrs and gates from castings. A wide range of density or hardness is available in canvas wheels. Intermediate hardness and greater flexibility are secured by using sewed sections of thinner canvas and gluing or cementing them into wheels. Maximum flexibility and adaptability with aggressive cutting are obtained by hand sewing or "quilting" sewed sec-

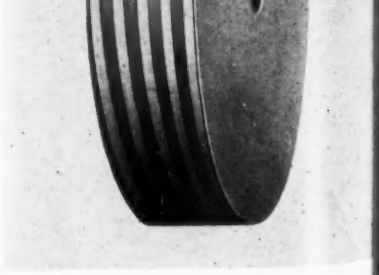


Fig. 5. Non-Streak Cloth Polishing Wheel

tions of single ply of canvas into wheels. Another variety of canvas wheel is made by assembling canvas discs together with wood screws. The solid glued canvas wheel is made by gluing individual discs of canvas belting together. It provides a flexible wheel with considerable hardness.

*Cloth or Muslin Polishing Wheels* (Figures 4 & 5)—Probably the most versatile and most used type of polishing wheel, they are made by combining individual machine-sewed buff sections into wheels by means of hand sewing, glue or flexible cements. Review of Part II of this series in the April 1944 edition of this publication will indicate the extent of density variation possible by selection of the type of fabric used and type and spacing of sewings applied to the individual buff sections. Additional variation of density is obtained by varying the ply in the buff sections (the larger the number of plies per section, the softer the wheel). Gluing the sections together produces the hardest wheel. Combining the buff sections with a flexible cement results in a softer more adaptable wheel and hand sewing the sections provides maximum softness and flexibility. The pressure applied while the glue or cement is "setting" also affects the density of the wheels (the higher the pressure, the harder the wheel). With the variations in density possible in this type of wheel, it finds applications in polishing of all metals from "roughing out" operations to fine finishing. Due to its relatively low cost, it is recommended for seasonal runs or intermittent polishing operations between the heavy, coarse "roughing out" work done with canvas wheels and the fine finishing work of leather wheels. One of the disadvantages of the solid glued cloth polishing wheels is the variation in face hardness resulting from the glued joints between the buff sections. This has been eliminated by special offset constructions (illustrated in Figure 5) that eliminate "streaking" by having the glued joints between the buff sections run in spiral rather than parallel planes.

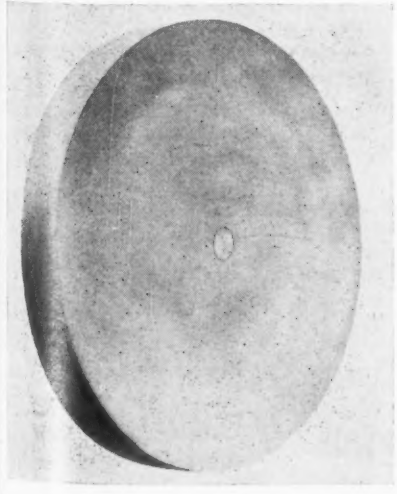


Fig. 6. Solid Felt Polishing Wheel.

*Felt Polishing Wheels* (Figure 6)—These wheels possess a cushion with characteristics unlike any other materials. Felt polishing wheels are fast-cutting, but have a resiliency or "springiness" that does not permit deep scratches or gouges by the abrasive grains. As a result, they find application in dry fining and "greasing out" or "coloring" operations where some metal removal is necessary, but a high "color" or lustre is desired. They are not recommended for general or "roughing out" polishing work. The "felting" process permits considerable variation in density and felt wheels are available in densities from extra soft to rock hard. The interlocking or "felting" properties of the fibres used in their construction tend to provide wheels with little tendency to spread and lose the face contours or edges. This feature makes felt wheels desirable for formed face polishing wheels. Felt is available in various grades, such as Spanish Felt and Mexican Felt. The felting process by which fibres are combined to form solid mats enables solid wheels to be made of felt in diameters up to 24 inches and face widths of 6 inches. Such *Solid Felt Polishing Wheels* (shown in Figure 6) possess the advantage over the glued disc type wheels of having a uniform solid face with no variation in hardness due to glued joints between discs. Where the disc or laminated construction is not disadvantageous, woven felt discs are combined by sewing and cementing or cementing alone to build felt wheels designated as *Sewed and Cemented Felt Polishing Wheels* or *Solid Cemented Felt Polishing Wheels* respectively.

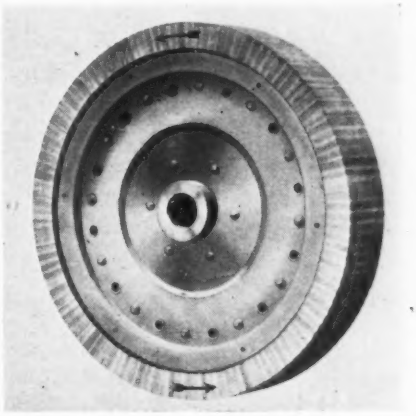


Fig. 7. Compress Leather Polishing Wheel.

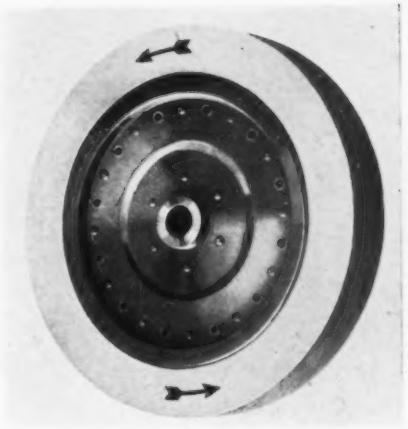


Fig. 8. Compress Canvas Polishing Wheel.

*Compress Polishing Wheels* (Figures 7 & 8)—This wheel brought a precision tool to the polishing trade. It is characterized by its smooth running, or inherent balance; long effective life, or ability to maintain its original characteristics such as density, roundness and face contours; and its uniformity, or freedom from hard or soft spots across or around its face. Although bull neck leather and canvas are the principal materials used in the cushion of the compress wheel, wheels are made with cushions of other materials such as walrus hide, felt and paper, when special requirements indicate their use. The construction of the compress polishing wheel is illustrated in Figure 9. It can be seen that it differs from other types of wheels and eliminates some of their disadvantages such as hard glue joints between discs and a tendency to wear "out of round". Essentially the compress wheel consists of a metal hub and side plates that hold a compressed ring of selected pieces of leather or prepared pads of bias cut canvas radially in its periphery or cushion. This construction requires no glue or cement, presents a continuous horizontal face of the cushion material with no seams or ridges in the planes of rotation of the wheel and utilizes only the endwise fibers of the cushion material, rather than both crosswide and endwise fibers as in the disc wheels. This favors better and more uniform penetration of the glue in "heading" opera-

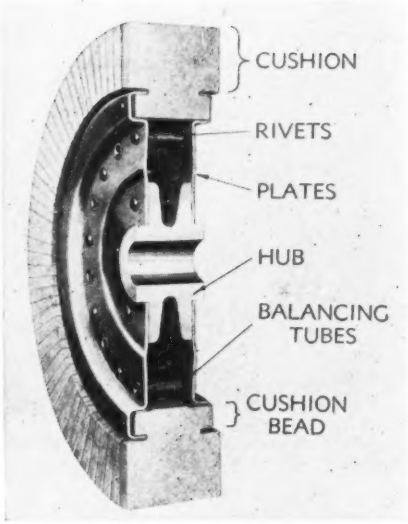



Fig. 9. Cross Section of Compress Polishing Wheel.

tions with consequent improvement in adhesion of the abrasive heads. Selection of the cushion material, variation of the length, thickness and number of pads or segments compressed into the wheel cushion permits wide variations, but close control, of the cushion hardness from super soft to super hard densities. This controlled flexibility in manufacture makes possible the construction of compress polishing wheels applicable to almost any polishing operation from coarse polishing to fining or coloring, on any type or shape of material, where the volume of work or requirements for a consistent, high quality of finish justify their higher initial cost. Another advantage of the compress wheel is its ability to take and hold contoured or formed faces without "mushing out" or spreading. Figure 10 illustrates a formed face Compress Canvas Polishing Wheel that materially reduces the number of operations necessary in polishing a lamp base.

This general review of the common types of polishing wheels is intended as a supplement to the descriptive literature available in manufacturers' catalogues. It is regretted that polishing operations present so many variables that a more informative approach to this subject could not be made. It is recommended that the advice of a polishing wheel supplier be obtained for definite suggestions in selection of wheels for specific polishing problems.

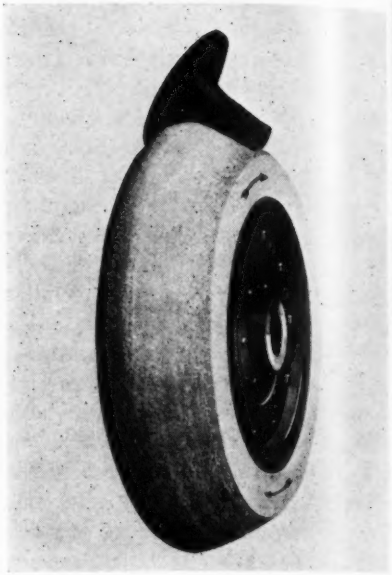


Fig. 10. Form Face Compress Canvas Polishing Wheel with object polished (lamp base).

## RECLAIMING OLD PIPE AND TUBING BY WIRE BRUSHING

ONE of the oldest and simplest power brushing operations, that of metal cleaning by wire brushing wheels, has become increasingly important during recent months due to its widespread application in reclaiming old, rusty, discarded pipe.

This observation has been verified in scores of industrial concerns where the method of quick pipe reconditioning has made it possible to return hundreds of tons of critical piping material back into service.

Very little equipment is needed for the process, the only essentials being a power driven spindle and wire brushing wheels of the proper size and gauge of wire.

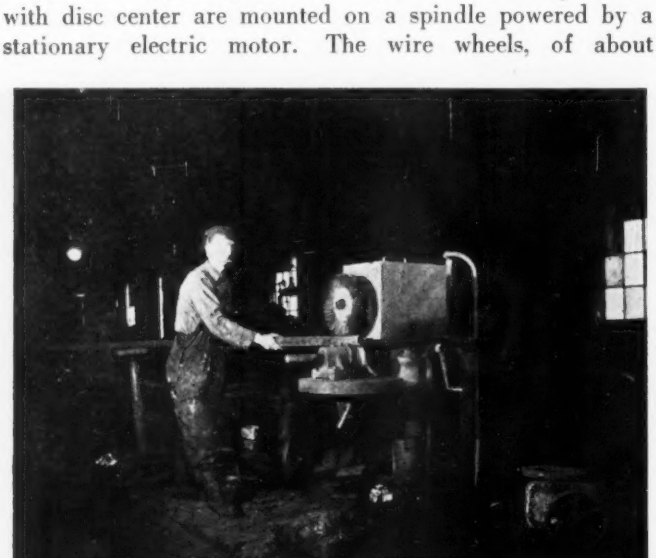
Typical of such installations is the one at The Builders Structural Steel Co., Cleveland, Ohio, where pipe in various sizes and lengths is power-brushed to a practically "good-as new" finish for many kinds of industrial re-use.

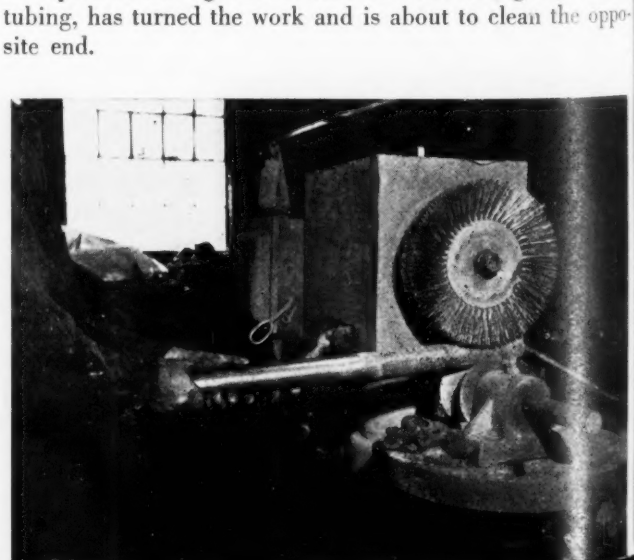
Depending upon the size of pipe being cleaned, combinations of two, three, four or more wire brushing wheels with disc center are mounted on a spindle powered by a stationary electric motor. The wire wheels, of about 33-gauge wire, revolve at a speed of 1800 revolutions per minute. Pipe is inserted between a roller mounted on the bed of the unit and the operator moves the pipe back and forth about 10 to 12 inches at a time under the revolving brushes, rotating the work slowly to clean all sides. This operation is illustrated in Fig. 1 (below left).

The roller fixture, which can be replaced with a size roller to fit the diameter of the pipe being brushed, is also adjustable by turning a hand crank on the side of the fixture so that the required pressure can be applied to thoroughly remove all rust and scale deposits.

A long length of pipe is handled by placing it on adjustable roller dollies one of which is shown behind the operator in Fig. 1.

The thousands of strong, special quality wires which comprise the brush sections do an excellent job of cleaning and burnishing the pipe surfaces, as shown in Fig. 2, where the operator having cleaned half of a short length of 2-inch tubing, has turned the work and is about to clean the opposite end.





# Patents

### Electrotype Backing

*U. S. Pat.* 2,352,905. A. E. Lundbye, assignor to The Crowell-Collier Pub. Co., July 4, 1944. The method of conditioning a copper plate for the adherence of an alloy of lead, tin and antimony which consists in subjecting the plate to a bath consisting of water, zinc chloride, and ortho-phosphoric acid.

*Example:*

| | |
|---|---|
| Water | 8 parts |
| Zinc chloride | 1 part |
| Phosphoric acid | 0.09 " |
| Wetting agent | Q. S. |

### Electroforming

*U. S. Pat* 2,352,968. S. T. Orton, assignor to Union Screen Plate Co., July 4, 1944. The method of making a pulp screen plate comprising the steps of initially shaping metal to provide a metal plate having a set of spaced ribs depending from the bottom of a thin, flat surfaced, imperforate top portion, coating the top surface of the plate with a non-conductive adhesive mask, thereafter cutting a series of parallel elongated narrow slots through the overlying coating and the thin imperforated top part of the plate between said ribs and leaving the top of the plate coated adjacent to the edges of the slots, thereafter electrolytically depositing a metal plating on said inner faces while the mask coating remains in position, then removing the mask and again electrolytically depositing a metal plating on the exposed faces of the plate.

### Plating Bath

*U. S. Pat.* 2,355,070. C. G. Harford, assignor to Arthur D. Little, Inc., Aug. 8, 1944. An aqueous electrolyte for the electrolytic deposition of metals, characterized by consisting essentially of a metal having an atomic structure presenting an incomplete outer electron shell, upon ionization, and a hydrocarbon alkyl diamine.

*Example:*

| | |
|---|---|
| Copper sulfate | 139 g./L. |
| Ethylene diamine | 135 " |
| Sulfuric acid | 8 cc./L. |

pH: 8.8. Temp.: 25-40° C. C.D.: 20-40 amp./sq. ft.

*Example:*

| | |
|---|---|
| Nickel sulfate | 190 g./L. |
| Nickel chloride | 45 " |
| Ethylene diamine | 85 " |
| Sulfuric acid | 5 " |

pH: 6. C. D.: 30 amp./sq. ft.

*Example:*

| | |
|---|---|
| Silver nitrate | 43 g./L. |
| Ethylene diamine | 38 " |
| Acetic acid | as required |

pH: 10. Temp.: 35-40° C. C.D.: 10-15 amp./sq. ft.

### Metallizing Apparatus

*U. S. Pat.* 2,355,186. M. Tischer (Czechoslovakia), vested in the Alien Property Custodian, Aug. 8, 1944. The method of forming a bright metallic deposit on the surface of an object which comprises separately and simultaneously atomizing a metallic salt solution on the one hand and a corresponding reducing solution on the other hand, simultaneously mixing these atomized solutions together and causing the atomized mixture thus formed to act on the object to be coated with said metallic deposit, and introducing at least one hot gas having a reducing action into the atomized mixture which is thus acting on the object.

### Plating Non-Conductors

*U. S. Pat* 2,355,933. M. Weiss, assignor to Cohan-Epner Co., Inc., Aug. 15, 1944. A process consisting in rolling plastic articles in sand, then washing off the sand, then immersing the articles first in a ferrous sulphate solution and then in a copper sulphate solution, and then immersing the articles in a bath, consisting of water, ethyl alcohol, sulphuric acid, quinol and stannous sulphate, then rinsing the articles in water and immersing the articles in a bath of sodium hydroxide, silver nitrate with ammonia, together with a reducing agent.

*Example:*

Rotate work in barrels with sea sand at 60-70 r.p.m. in order to roughen surface. Rinse and dip in 1% ferrous sulfate solution for 15 minutes at 30° C. Then immerse in 2% copper sulfate solution for 3 minutes at 30° C. Activate the surface by immersing for 45 minutes in the following solution and metallize by any of the usual silvering processes:

| | |
|---|---|
| Water | 800 cc. |
| Ethyl alcohol | 200 " |
| Sulfuric acid | 5 " |
| Quinol | 10 g. |
| Stannous sulfate | 30 " |

### Anodizing Aluminum

*U. S. Pat.* 2,356,543. C. Sonnino and A. Sassetti (Italy), vested in the Alien Property Custodian, Aug. 22, 1944. The process for making an anodic deposit upon an article of aluminum and its alloys which consists in immersing the article in an aqueous solution consisting essentially of chromic acid, zinc chromate and magnesium chromate and making the article the anode of an electric circuit through the solution.

*Example:*

| | |
|---|---|
| Zinc chromate | 0.5-20% |
| Magnesium chromate | 0.5-20% |
| Chromic acid | 5% to saturated |

AC or DC current. Temp.: 20-80° C. Voltage: 10-25. C.D.: 1.8-2.5 amp./sq. dm.

### Corrosion Prevention of Metals

*U. S. Pat.* 2,356,575. J. Frasch (France), vested in the Alien Property Custodian, Aug. 22, 1944. Process for forming a protective coat on a metal selected from the group consisting of iron, aluminum, copper and lead, in which said metal, in the absence of any external source of electric current applied to it, serves as a cathode in an oxidizing solution consisting of chromic acid and potassium permanganate through which solution passes a galvanic current engendered by connecting said cathode by means of an external conductor to a magnesium electrode immersed in the same solution and serving as an anode spaced from said cathode.

### Bright Dip for Stainless Steel

*U. S. Pat.* 2,357,219. N. S. Mott, assignor of one-half to Joseph P. Moran, Aug. 29, 1944. A chemical bath for the treatment of stainless steel articles to provide a mirror finish thereon which contains from 10 to 30% by weight of nitric acid, effective amounts up to 30% by weight of hydrofluoric acid, 5 to 15% by weight of a chloride of a metal selected from the group consisting of cobalt, nickel, iron, chromium and titanium, and the balance substantially all water.

*Example:*

| | |
|---|---|
| Nitric acid | 25% by wt. |
| Hydrofluoric acid | 15% " |
| Water | 50% " |
| Metal chloride | 10% " |

Temp.: 180-200° F.
Time: Few seconds to 5 minutes.

The chloride in the formula may be cobalt, nickel, iron, chromium or titanium.

### Stain Prevention of Tin

*U. S. Pat.* 2,357,970. F. E. Rath, Sept. 12, 1944. The method of preventing formation of "yellow stain" on tinned material having thereon a porous oxide film which comprises vigorously scrubbing the tinned surface and applying thereto a hot caustic alkali solution containing an oxidizing agent.

*Example:*

| | |
|---|---|
| Sodium hydroxide | 1% by wt. |
| Chromic acid | 0.33% " |

Temp.: 180° F. Time: Up to 5 seconds.

### Cleaning Magnesium

*U. S. Pat.* 2,357,991. K. B. Avers, assignor to Wingfoot Corp., Sept. 12, 1944. A method of cleaning a material selected from the group consisting of magnesium and magnesium alloys which comprises treating it with an aqueous solution of chromic acid and chromium trifluoride.

*Example:*

| | |
|---|---|
| Chromic acid | 20% |
| Chromic trifluoride | 0.1% |

Temp.: 212-215° F.

### Indium Bath

*U. S. Pat.* 2,358,029. A. J. Phillips and H. B. Linford, assignors to American Smelting & Refining Co., Sept. 12, 1944. A process of electrodepositing indium metal on a cathode surface which comprises passing electric current through a prepared electro-

lyte solution consisting of an aqueous solution of indium sulphate and sulphuric acid, said solution containing from 5 to 130 grams of indium per liter of electrolyte, using soluble indium anodes and insoluble anodes with cathode electrode under pH controlled conditions in order to form a dense, coherent crystalline deposit of metallic indium on the cathode, and wherein the pH value of said electrolyte is maintained between 1.5 and 3.4 during electrolysis by means of said soluble and insoluble anodes to cause the deposition of a smooth adherent deposit of indium on the surface of the cathode.

*Example:*

Indium (as sulfate) ..... 18.2 g./L.
Sulfuric acid ..... as required for pH
pH: 2.1-2.3. C.D.: 30 amp./sq. ft.
Cathode Efficiency: 65%.

Alkali sulfate may be added for conductivity and glue or gelatin for smoothening the deposit.

### Hot Dipping Lead

*U. S. Pat.* 2,359,993. W. L. Keene, assignor to Rustless Iron and Steel Corp., Oct. 10, 1944. In the lead-coating of stainless steel wire containing one or more of molybdenum, columbium and titanium, the art which comprises, continuously passing the wire through a heating chamber, thence through a cooling chamber, both chambers containing a dry atmosphere of hydrogen and nitrogen, then passing the wire through an aqueous fluxing bath of hydrochloric acid and hydrofluoric acid saturated with ammonium chloride and maintained at a temperature of about 200° to 250° F., and thence into the air to dry, and thereafter passing the wire through a bath of molten lead at a temperature of 680° to 900° F.

### Vitreous Enamelling

*U. S. Pat.* 2,360,413. C. A. Getz and G. Weidmann, Oct. 17, 1944. A method of producing vitreous enamel coated objects, comprising applying a binder composed essentially of substantially pure lead silicate to the cleaned surface of an object formed of a non-ferrous metallic material consisting of from 80% to 100% copper and substantially lead-free, firing all portions of the object and the binder to a uniform temperature falling between 1400° F. and 1500° F., applying enamel frit to the binder treated surface of the object, and firing all portions of the object, the binder, and the enamel frit to a uniform temperature falling between 1380° F. and 1480° F.

### Polishing Sheets

*U. S. Pat* 2,360,504. T. J. Masse (Australia), assignor to The Edes Mfg. Co., Oct. 17, 1944. Apparatus for grinding and polishing metal sheets comprising a horizontal work table, a vertical spindle mounted above said table, said spindle having abrading means fastened to its lower end and adapted to bear on the surface of a sheet on said table, means for rotating said spindle at high speed, continuously operating means for reciprocating said table in a linear path beneath said spindle and continuously operating means for reciprocating said spindle in a crosswise linear path above said table, said means for reciprocating said table and spindle each being operative to move the respective table or spindle at a constant rate over substantially all of its linear path of movement, but each including means for delaying appreciably the restarting of the respective table or spindle movement at each end of its path.

### Pickling Composition

*U. S. Pat.* 2,360,509. J. D. Morgan and R. E. Lowe, assignors to Cities Service Oil Co., Oct. 17, 1944. A composition for removing rust and oxide scale from metal objects, comprising a dilute aqueous solution formed by mixing from seven to ten parts by weight of concentrated orthophosphoric acid, from three to five parts by weight of an alkali metal bisulfate, from five to seven parts by weight of an alkali metal acid phosphate, from 0.1 to 0.5 part by weight of a mineral oil sulfonate, and from eighty to one hundred parts by weight of water.

### Hot Galvanizing Alloy

*U. S. Pat.* 2,360,784. A. J. Mauger and A. H. Ward, assignors to Carnegie-Illinois Steel Corp., Oct. 17, 1944. A bath for hot dip galvanizing, which consists of zinc containing from approximately 0.5% to approximately 1% lead, from approximately .20% to approximately .50% cadmium, and from approximately 0.05% to approximately 0.2% of antimony.

### Electroformed Abrader

*U. S. Pat.* 2,360,798. R. A. Seligman and H. H. Schwarzkopf and J. G. Van Otterloo, assignors, by mesne assignments to Seligman, Oct. 17, 1944. The method of forming upon a metal surface an abrasive layer consisting of dust-like diamond particles secured within a hard metallic matrix which includes the steps of electroplating matrix metal upon said metal surface in an electroplating bath containing a mass of diamond particles substantially in excess of the number of particles required for the desired abrasive layer, and intermittently causing the particles adjacent said surface to shift abruptly relative to said surface after a period of electroplating during which part at least of said mass of particles has remained relatively motionless in contact with said surface.

### Manganese Plating

*U. S. Pat.* 2,361,143. K. M. Leute, C. L. Mantell and W. L. Hammerquist, assignors to Electro Manganese Corp., Oct. 24, 1944. In a cyclic process for the electrowinning of manganese employing an electrolytic cell divided into catholyte and anolyte chambers containing catholyte and anolyte, respectively, and cyclic process comprising the withdrawal of anolyte liquid from the anolyte chamber, replenishment of manganese therein and addition of said replenished electrolyte to the catholyte chamber thus establishing a main circulation stream of electrolyte, the method of controlling the concentration of manganese salt in the catholyte liquid which comprises passing current through the anolyte and catholyte electrolyte at a density sufficient to remove manganese from the catholyte and deposit it on the cathode at a predetermined rate in terms of grams per liter per minute; continuously feeding, to the catholyte chamber, catholyte feed liquid having a predetermined maximum concentration of manganese in the form of a soluble salt thereof; continuously withdrawing, from the catholyte chamber, catholyte liquid having less manganese per liter than the liquid fed to said chamber; restoring the concentration of manganese in said withdrawn liquid to about that of the feed liquid; returning said withdrawn liquid to the catholyte chamber and thereby recirculating it in shuntwise relation to the main circulation stream, and maintaining the recirculation at a rate sufficient to maintain in the liquid withdrawn from the catholyte chamber a predetermined minimum concentration of manganese.

### Vitreous Enamels

*U. S. Pat.* 2,361,376. L. C. Athy and P. C. Sufft, assignors to Pemco Corp., Oct. 31, 1944. A milled ground coat vitreous enamel adapted to be fired onto an iron base and characterized by a greatly increased firing range as compared to normal ground coat enamels, said enamel of increased firing range comprising the smelted frit reaction product of refractory and fluxing ingredients together with an adherence medium including a cobalt-containing constituent, the latter being present in the frit in an amount varying between about 0.05% and about 0.9% expressed as cobalto-cobaltic oxide, and a phosphorus-containing constituent in an amount adapted to substantially increase the burning range of the enamel while inhibiting any appearance of roughness in the fired enamel; and a milled-in antimony-containing medium in an amount adapted to promote the adherence of the enamel to an iron base while inhibiting any appearance of fuzziness in the fired enamel.

### Metal Spray Gun

*U. S. Pat.* 2,361,420. A. P. Shepard, assignor to Metallizing Engineering Co., Inc., Oct. 31, 1944. In a metal spray gun of the wire feed gas blast type, having a gas blast duct and a wire feed duct for feeding a metal wire to the melting zone of said gun, the improvement comprising a multiple number of holes around the wire feed duct of said gun, and a multiple number of bleeder gas passages converging on said wire feed duct in the direction of wire feed therein, said passages terminating in said holes and connecting said holes with said gas blast duct, said holes and said passages being positioned, and dimensioned to bleed blast gas into said duct sufficient to overcome pressure at the nozzle tip of said gun, said gas blast bleeder holes being spaced apart a considerable distance from each other to substantially reduce wire tip fluctuation in said melting zone.

# THIS IS WASHINGTON—

By George W. Grupp
METAL FINISHING's Washington Correspondent

**Tubbs Present Holder of Attendance Prize Money** L. G. Tubbs of Baltimore, Meeting Chairman for November of the Baltimore-Washington Branch of the A.E.S., set out to beat the record attendance of 70 of the December, 1943, meeting. In spite of the other attractions in Baltimore on November 4, 1944, he came within a few of his goal since the attendance totalled sixty-five. Because of the energy and enthusiasm Tubbs put into making the meeting a success, he got Dr. Abner Brenner to come to Baltimore with "his entire harem from the Bureau of Standards." This splendid cooperation of "Sultan" Brenner and the number of guests present from the United States Army Signal Corps, the Research Products Company, and the Westinghouse Company, made it necessary for Brenner to hand over to Tubbs, as temporary holder, or perhaps permanent holder, the ten dollars attendance prize money for the 1944-45 session.

**Sample Talks on Salt Spray Tests Before Baltimore-Washington Branch** The November Meeting of the Baltimore-Washington Branch of the A.E.S., which was held at the Westwood Restaurant in Baltimore, was presided over by President Ken Huston. L. G. Tubbs, in the absence of Librarian Walter A. Olsen, introduced Mr. C. H. Sample, Finish Engineer of the Bell Telephone Laboratories, who addressed the Branch members and its guests on the subject of "Salt Spray Tests." He opened his address by suggesting that greater interest should be taken in salt spray tests (a) because they are now more frequently included in material specifications, and (b) because of the current revisions which are being made in ASTM specifications. The present objections to salt spray test requirements in specifications, he said, are due to (1) the ambiguously worded salt spray test specifications; (2) the faulty manner of specifying how the tests should be made, and (3) the inexperience of many salt spray testers. To emphasize some of his points he quoted samples of ambiguously worded salt spray test specifications on plating. He suggested that the specifications should state (a) the kind of apparatus which should be used in making the tests; (b) the methods of using the apparatus; (c) how the specimens should be prepared; (d) the angle of inclination of the specimens placed in the fog and salt spray chamber; (e) the temperature which should be maintained in the chamber; (f) the density of the fog in the chamber; (g) if the tests are to be intermittent or continuous, and (h) how the reports on the tests are to be prepared. He illustrated his part of the talk on testing methods with fifty different colored slides showing the results of humidity and salt spray tests of hundreds of specimens of steel coated with cadmium, chromate, chromium, copper, lead, nickel, tin, and zinc. Some of the specimens were subjected to 200 hours of salt spray, while others were given 500, 700 and 1,000-hour salt spray tests. Before concluding his talk he discussed briefly the effect of salt spray tests on different thicknesses of protective coatings, and the speed of corrosion of different types of plating under different atmospheric conditions. For example, he said there was a difference of behavior between cadmium plating and zinc plating in salt spray tests. Cadmium, he said, fails more quickly than zinc in New York City.

**Blum and Soderberg Enliven Meeting With Their Remarks** At the conclusion of Mr. Sample's illustrated talk, Dr. William Blum of the National Bureau of Standards, made some interesting and informative remarks on tests which were made at Sandy Hook. Gustaf Soderberg of the WPB remarked that cadmium fails faster than zinc in industrial communities. And Soderberg pointed out that the various government agencies are now engaged in formulating a standard form of salt spray test to overcome the present confusion of different tests for different government agencies. This stimulated the suggestion from a number of members present that the specifications should define what is meant by the terms "corrosion" and "scratch." They would also like to see the new specifications stipulate the width and thickness of a scratch on the plating, sub-coating, and basis metal.

**Advisory Council of Baltimore-Washington Branch Appointed** During the business session of the meeting, President Ken Huston announced the appointment of an Advisory Council consisting of Fred F. Pierdon of the Art Metal Finishing Company of Washington, Samuel R. Warnock of the Washington Navy Yard, and Thomas F. Slattery of the Treasury Department's Bureau of Engraving and Printing.

**"What Are Hard Goods?"** In the November issue of *Metal Finishing* the editor of the Odds and Ends column posed the question: "What Are *Hard Goods?*" This question is important because it involves the intelligence of the hard working Government dignitaries. The word "hard" means firm and unyielding in substance; something difficult to do or understand; something perplexing; or something, or somebody, unfeeling in character or demeanor, if one is to believe Noah Webster. This lexicographer—that's a ten dollar word for Webster—is also of the opinion that the noun "Goods" means the plural of good; and that the noun "good" means that which contributes to happiness; moral qualities; prosperity; a piece of household furniture; or an article of merchandise; property; wealth. Armed with this information the writer of this column set out to question the profundo intelligensia of the WPB as to what they mean by the term "Hard Goods Bureau." After much running about and questioning this writer felt like Old Mother Hubbard since no one seemed to know exactly what is meant by "Hard Goods." One learned member of the WPB in desperation began pulling out the hair of his head. Before he became completely bald and gave up the ghost, he whispered: "No one knew what to call it so they decided to name it the 'Hard Goods Bureau.'" So there you are, Mr. Odds and Ends Editor. You see, Washington is becoming crowded with intellectual foreigners who have decided to tell Americans what to do.

**New Joint Contract Termination Regulation Issued** The War and Navy Departments issued on October 31, 1944, a new joint contract termination regulation. This agreement of rules and forms to be used by these two departments of the Government is expected to speed-up and simplify the procedure of contract settlement and property disposition. Procurement Regulation No. 15 of the War Department and the contract termination directives issued by the Navy Department were replaced by this Joint Termination Regulation. The purpose and scope of this Joint Termination Regulation is to provide workable tools for carrying out the three-fold purpose of the Contract Settlement Act of 1944: to settle termination claims fairly and quickly; to promptly clear termination inventory from war plants; and to provide adequate interim financing. In conjunction with the Joint Termination Regulation there was issued a pamphlet on the "Standard Contract Settlement Proposal Forms," a brochure on "Termination Financing for War Contractors," and a new "Navy Materials Inspection Service Manual on Contract Termination."

**The Term "Scrap" Redefined in Price Regulation** The definition of the term "scrap" was changed by issuing Amendment 5 to Revised Maximum Price Regulation 204 on November 6, 1944. Scrap is now defined as "the waste or by-product of any kind of fabricated or manufacturing operation, including all material defined as scrap by any other maximum price regulation." Under the terms of this amendment all persons who wish to buy surplus industrial materials for use as scrap must pay maximum scrap prices for them.

**What Is Meant By the Term "Order"?** Interpretation 12 to Priorities Regulation No. 1, issued on November 8, 1944, states that "Section 944.7 (b) of PR 1 provides that between conflicting orders which bear the same preference rating, precedence must be given to the order which was received first with the rating." It then goes on to say that "the word 'order' as used in Section 944.7 (b) means a purchase order accompanied by specifications in sufficient detail to enable the manufacturer to put the product in production. Not until such specifications have been furnished is there an 'order.'"

**Huge Quantities of Machinery and Equipment for Sale or Lease** The Surplus War Property Division of the Defense Plant Corporation is now actively engaged in negotiating the sale, or lease, of nearly 1,000 War Department and Defense Corporation plants and plant sites located in every state of the Union and consisting of tens of thousands of acres, countless steel, wood and concrete structures with millions of square feet of floor area, and equipped with thousands of pieces of machinery and equipment such as agitators, abrasive cutting machines, acid tanks, alcohol vessels, air conditioning units, blower units, cranes, caustic soda wash units, cadmium fume precipitators, Diesel powered electric generating sets, degreasers, dust collecting systems, dryers, electric motors, electric industrial trucks, filters, heaters, heat exchangers, laboratory apparatus and equipment, measuring instruments, polishers, plating equipment, racks, spray booths, steel tanks, sandblast equipment, storage tanks, and wooden tanks. Some of the operators of these Government-owned plants, which also serves to indicate the type of plants and machinery and equipment available, were Aluminum Company of America, Aetna Ball Bearing Manufacturing Co., American Cyanamid & Chemical Corp., American Zinc Co., Allis Chalmers Manufacturing Co., Basic Magnesium Co., Benjamin Franklin Graphite Co., Bridgeport Brass Co., Brush Beryllium Co., Bohm Aluminum & Brass Corp., Chicago Chemical Co., Carbide and Carbon Chemical Corp., Delta Chemical Manufacturing Co., Davison Chemical Co., Dow Chemical Co., E. I. du Pont de Nemours & Co., Emerson Electric Co., Ex-All-O Corp., Ferr-Enamel Corp., Gilbert Cummins Co., General Electric Co., General Ceramics Co., General Motors Corp., Hooker Electro-Chemical Co., Hercules Powder Co., Hegeler Zinc Co., International Minerals and Chemical Corp., Johnston & Jennings Co., Keokuk Electro Metals Co., Krome Corp., Mathieson Alkali Works, Inc., Midwest Solvents Co., Molybdenum Corporation of America, New Britain Machine Co., Nicaro Nickel Co., National Carbide Corp., National Lead Co., Phelps Dodge Corp., Pataganset Finishing Co., Inc., Reynolds Metals Co., Revere Copper & Brass Co., Stupakoff Ceramics Manufacturing Co., Southern Acid & Sulphur Co., Shell Chemical Co., Tin Processing Corp., The Q. O. Chemical Co., Tung-Sol Lamp Works, Inc., United States Industrial Chemicals, Inc., Westinghouse Electric and Manufacturing Co., Wellman Bronze & Aluminum Co., Westvaco Chlorine Products Corp., Western Electrochemical Co., and a number of ordnance plants of the Army.

**Surplus Property Disposal Continues Under Executive Order 9425 Until Board is Appointed** Some of the provisions of the Surplus Property Act of 1944 cannot become effective until the three members of the Surplus Property Board have been appointed by the President and that Board has issued some regulations to clarify certain provisions of the Act. In fact it is believed by some persons in Washington that the whole Act will have to be gone over by Congress to clear the fog. Until this Board is appointed the disposal of surplus property will be continued under Executive Order No. 9425.

**Surplus Property Administrator Submits Voluminous Report** Will L. Clayton, Surplus War Property Administrator, recently submitted his report on the activities of the Surplus War Property Administration to Director of War Mobilization James F. Byrnes. This voluminous report of several hundred pages in length gives a detailed exposition of the surplus disposal structure. It describes the methods used to dispose of surpluses by the various disposal agencies. To this report are appended copies of important documents such as (a) the administration's regulations and policy statements; (b) reports of committees appointed by the administration to deal with specific problems; (c) statements of the administrator on proposed legislation, and (d) statistical summaries.

**An Outline for Making Surveys Released By the Department of Commerce** The Department of Commerce recently released a revised version of its 45-page bulletin called "An Outline for Making Surveys." Dr. Amos E. Taylor, Director of the Bureau of Foreign and Domestic Commerce is of the opinion that the value of this booklet to small businessmen can be very great "in encouraging surveys which will high-spot market possibilities for small manufacturers and distributors as well as industrial and commercial opportunities open to individuals interested in entering business as proprietors for the first time." The booklet outlines the procedure of making a survey; and it supplies the investigator with a list of source material. Copies of this booklet may be obtained from the local Department of Commerce offices, or from the Superintendent of Documents, Washington 25, D. C., for ten (10) cents.

**Aluminum Scrap Centers Established By Army** The War Department announced on November 2, 1944, the establishment of eleven points to be used for the distribution of aluminum scrap. These points are Philadelphia, Chicago, Camp Phillips, Fort Lewis, Camp Forrest, Camp Howze, Camp Haan, Camp Gruber, Sommerville Quartermaster Depot, Lake Ontario Ordnance Works, and Grand Blanc, Michigan.

**Antique Tableware Exempt from Price Control When Repaired or Serviced** Amendment No. 54 to Revised Supplementary Regulation 11 to the General Maximum Price Regulation issued on November 6, 1944, provides that charges for the repair, maintenance and other servicing of antiques are exempt from

price control. This applies to tableware which is at least 75 years old.

**Brass Plating Now Permitted Certain Types of Hardware** Brass plating may now be used on cabinet locks, padlocks and builders' finishing hardware with the exception of door hangers, tracks and related items because Schedule I of Order L-236 was amended on October 19, 1944, to permit this form of plating. Nickel, chrome and cadmium plating, however, are still prohibited. The types of brass plating now permitted are U. S. 3, polished brass; U. S. 4, dull brass; U. S. 8, antique copper; U. S. 9, polished bronze; and U. S. 10, dull bronze.

**Carbon Tetrachloride Shortage Causes** The increased military demand for carbon tetrachloride, trichlorethylene and perchlorethylene, especially for metal degreasing purposes, are responsible for the shortage of these solvents the WPB made known on October 28, 1944.

**Church Goods Problems Discussed** Representatives of the WPB told members of the Church Goods Manufacturers Industry Advisory Committee at their October meeting that only limited quantities of copper and brass are available to church goods manufacturers. Manufacturers who need copper and brass for essential church goods must file Form CMP-4B with the Consumers Durable Goods Division of the WPB. The standard labor form (WPB-3820) must accompany the application. All manufacturers who apply for new allotments or increased allotments of materials must file Form WPB-3820. It was also revealed at this meeting that increased amounts of silver will not be granted for church goods because of the decline in the supply of domestic silver. The nickel restrictions will not be lifted in the immediate future.

**Coated Abrasive Products and Service Tool Restrictions Eased** The War Production Board announced on October 31, 1944, that buyers of coated abrasive products are no longer required to file Form WPB-3478 and purchasers of certain types of mechanics' hand service tools are no longer required to file Form 1319. This was accomplished by amending General Scheduling Order M-293, Table 12. But mechanics' hand service tools, it should be remembered, are still under control of General Preference Order E-6 and Order L-216.

**Electronic Equipment Controls Will Not Be Revoked for Some Time** Members of the WPB Industrial Sound Equipment Industry Advisory Committee, at their November meeting, voiced the opinion that electronic equipment controls should not be revoked until all military requirements can be met. Instead they recommended that the controls should be modified as war demands decrease and materials become more abundant in supply. It was also revealed at this meeting that the Government Printing Office will soon release a pamphlet entitled "Guide of Industrial Sound." This booklet will explain the uses and value of industrial sound equipment.

**Restrictions on Types and Sizes of Enamel Ware Removed** Limitation Order L-30-b was amended on November 14, 1944, to permit the production of any type of enameled ware. But even though restrictions on production have been relaxed yet the over-all production will not be increased because the order continues to restrict the use of iron and steel for civilian enameled ware production to 70 per cent of usage in the year ending June 30, 1941. The only thing it does is to permit a manufacturer to make any type or size he sees fit to make for his available supply of materials.

**Flatware Restrictions Eased** On November 11, 1944, Limitation Order L-140-b was amended for the purpose of permitting the manufacture of chromium plated and silver plated "oval bowl teaspoons with 5 inch or 8 inch handles, tablespoons, dinner forks, salad forks, and oyster forks." But even though this looks like a possible expansion in flatware and hollow ware production, yet the over-all quantity of flatware will not be increased because additional steel is not available for such purposes.

**Galvanized Ware Liberalized** Ash sifters, diaper cans, liquid and dry measures, utility baskets and watering pots have been added to the list of galvanized ware articles which may be made under Limitation Order L-30-a as amended November 14, 1944. The amended order eliminated size restrictions on all permitted galvanized ware.

**Laboratory Equipment Restrictions Tightened** General Limitation Order L-144 was amended on October 21, 1944, for the purpose of restricting the number of types of laboratory equipment which may be sold or delivered upon authorization. This is due to a shortage of such equipment as analytical balances, centrifuges, metalloscopes and metallographs, spectrographs, spectrometers and spectrophotometers. Ratings for these items, which are specified in List A of the amended order, are assigned on Form WPB-1319.

**Military Insignia Demand Is Increasing** Members of the Military Insignia Manufacturers Advisory Committee were told by WPB officials at their October meeting that there was urgent need of the industry to exert every effort to meet the quotas for military insignia. The demand for insignia made from brass and gold plate is greater than that made from silver and gold plate. Members of the Committee requested that Copper Order M-9-c be amended to permit the industry to use copper and brass in the making of military insignia. In reply to this request the WPB officials said that the supply of refined copper is insufficient to permit the use of copper for this purpose.

**Non-Necessity Certificates Ease Amortization Load** The War Production Board announced during the past month that any person who owns facilities that have ceased to be necessary in the war effort for which a Necessity Certificate was issued may now apply to the WPB for a "Non-Necessity Certificate." This certificate has the effect of terminating the amortization period as it concerns any facilities covered by the certificate. Such facilities then may be amortized over a period of time ending with the date specified in the Non-Necessity Certificate. Applications for Non-Necessity Certificates should be made on Form WPB-3984.

**Plated Shaving Equipment Not Exempt** The Office of Price Administration issued Amendment No. 10 to Supplementary Order No. 45 on November 16, 1944, which provides that shaving equipment made of precious metals is now exempt from price control. But this amendment specifically states that it does not include shaving equipment plated with precious metals.

**More Metal for Plumbing Fixtures Will Be Made Available** Limitation Order L-42, Schedule XII, was amended October 18, 1944, to permit greater use of metal in the production of shower stalls, shower receptors, and various types of plumbing fixtures. For example, the amount of copper or copper base alloys which may be used in producing nonmetallic wash fountains has been increased from one pound to five pounds. This order was amended to conform with Zinc Order M-11-b which was amended on September 5, 1944, for the purpose of permitting the use of zinc for plumbing fixtures, fittings and trim. But in spite of these changes chromium, nickel and cadmium for plating these plumbing fittings are still prohibited according to an announcement made by the WPB on November 13, 1944.

# SHOP PROBLEMS

PLATING AND FINISHING
POLISHING — BUFFING
CLEANING — PICKLING
HOT DIP FINISHES

METAL FINISHING publishes, each month, a portion of the inquiries answered as a service to subscribers. If any reader disagrees with the answers or knows of better or more information on the problem discussed, the information will be gratefully received and the sender's name will be kept confidential, if desired.

## Specular Alzak on Aluminum

*Question:* Can you give us any information on the process called "Specular Alzak on Aluminum" for light reflection purposes?

A. A. B. E. Corp.

*Answer:* This process involves anodizing at 9-12 volts and 80-82° C. in a brightening solution containing sodium carbonate and trisodium phosphate, to which an ammonium salt may be added.

After this treatment the film is reinforced by anodizing in a 20% sodium bisulfate solution at 10 volts.

This process is patented and obtainable under license arrangements from the Aluminum Company of America, Pittsburgh, Pa.

## Etching of Metal

*Question:* We are very anxious to obtain literature and other available sources of information on the etching of various metals such as are used in name plate production.

Any references which will guide us in obtaining the above will be much appreciated.

T. M. Corp.

*Answer:* The following references are suggested, of which the first two are quite inclusive:

National Bureau of Standards, Letter Circular LC-616 (1940).

W. T. Brannt, Metal Workers Handy Book (1919).

Plating & Finishing Guidebook—1940 edition.

Finishes for Aluminum, published by the Aluminum Company of America.

Platers' Guide, **32,** 12 (1936).

## Copper Plating

*Question:* We are operating two copper plating tanks in unison, used directly on steel surfaces for protection against carburizing. Operating data on both solutions approximate conditions as given below:

| | |
|---|---|
| Metallic Copper | 2.5 oz./gal. |
| Free Cyanide | .20-.30 oz./gal. |
| Carbonates | 4.0 oz./gal. |
| pH | 10.2 |
| Temperature | 112° F. |
| Volts | 2.0-3.0 |
| Current | 10-15 A. S. F. |
| Anodes | Rolled Annealed Copper |

No brighteners are being used. Tanks are of steel, 1200-1600 gallon capacity and semi-automatic type. We are operating 24 hours a day at full load on these tanks and consequently we are experiencing some difficulty in holding up the metallic content of the bath. Anode efficiency seems to be about normal but copper additions must be made about every two weeks to hold it above 2.0 oz./gal.

Plating cycle is approximately 1 hour to obtain a plate of 0.0005" and would like to speed this up to a 30 minute cycle for the same depth, if possible. We have considered a change-over to a Rochelle Salt bath but the higher temperature and current involved are too much for our present type of lacquer stop-off paint. Can you suggest a stop-off paint that will operate successfully in the Rochelle solution and would be available under present conditions?

Our procedure is subject to criticism, at least as I see it, in this respect: We have not been using any insulation on our plating hooks for some time and consequently build up a copper deposit there which creates a problem in operation and disposal. The operator claims that under production pressure it is cheaper to allow the metal to build up on the hooks and eventually crack it off and scrap it than it is to attempt to keep up with a stop-off dip coat to prevent the deposition. He may be right economically but I think he may be wrong in sacrificing considerable plating efficiency of the bath. Do you know of any practical method of stripping this metal from the hooks so that it would be salvaged and re-used in the plating bath? Also would like to know of the latest development in insulation of plating hooks.

I will appreciate your comments and suggestions and thank you in advance for a reply at your earliest convenience.

R. R. B. Co.

*Answer:* We suggest that you operate with a higher metal and free cyanide content for faster plating. A solution containing three oz./gal. of metal, and one oz./gal. of free cyanide will be satisfactory.

If you do not have enough current for operation at higher current densities the only way to increase the plating speed is by increasing the cathode efficiency and coating the hooks so that no current is wasted in depositing copper on them. This may be done with a suitable stop-off, obtainable from manufacturers of such materials. We enclose herewith a list of such manufacturers.

If the articles being plated are not too large the hooks may be made of steel or stainless steel. When plated with copper, they can be placed in an anode basket and used as anodes until the copper is dissolved. In this way, there will be no loss of copper and no deterioration of the hooks.

Despite your feeling that the Rochelle copper bath with its higher temperatures and current densities is too much for your equipment, this bath is very commonly used for the purpose, and has the advantage of higher efficiency which is very important in your case.

## Porosity Test

*Question:* We are interested in a porosity test similar to the ferroxyl test for aluminum on steel. Can you tell us what modification of the ferroxyl test is necessary for this test to work?

M. E. Co., Inc.

*Answer:* We do not know any modification of the ferroxyl test which would be suitable for aluminum on steel. However, you might try the following porosity tests:

1. Immerse in 5% acetic acid followed by immersion in a warm solution containing 5% tannin and 1% or 2% hydrogen peroxide. Pores show a blue coloration on exposure to air.

2. Hot Water Test—immerse at 95° C. for six hours in distilled water slightly pink to phenolphthalein. Rust spots with black nuclei form.

## First Aid

*Question:* We shall appreciate it if you will inform us as to whether you know of a first-aid kit to be kept in plating rooms for the emergency treatment of cases of cyanide poisoning. We have not had any such cases, but we wish to guard against the danger as far as possible.

L. E. P.

*Answer:* The recommended treatment is to administer a pint or two of dilute sodium thiosulfate solution, and to have the patient inhale vapors of amyl nitrite.

Your kit would, therefore, contain a few quarts of sodium thiosulfate solution, and a few 1 oz. ampoules of amyl nitrite.

## Patents

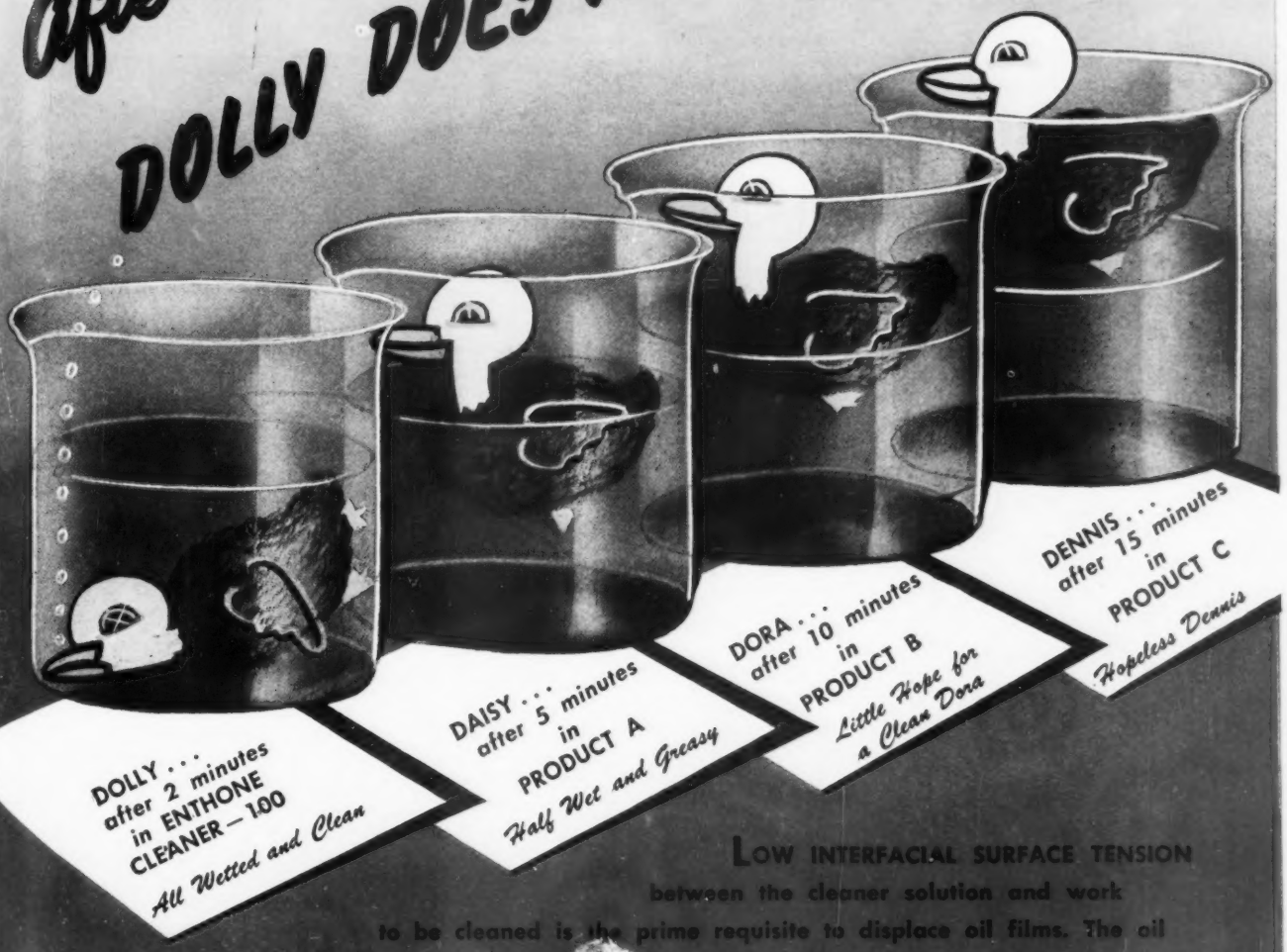
*Question:* Will you please give us a list of companies holding patent rights on colored and decorative chrome plating solutions?

E. S. P. Wks.

*Answer:* A large number of patents has been issued on this subject, the list being much to extensive for inclusion in a letter.

If the subject is of sufficient importance to you, we would suggest that you examine the patent files.

# After 2 minutes in Cleaner-100 DOLLY DOES A DIVE


DOLLY . . . after 2 minutes in ENTHONE CLEANER—100
All Wetted and Clean
DAISY . . . after 5 minutes in PRODUCT A
Half Wet and Greasy
DORA . . . after 10 minutes in PRODUCT B
Little Hope for a Clean Dora
DENNIS . . . after 15 minutes in PRODUCT C
Hopeless Dennis

LOW INTERFACIAL SURFACE TENSION between the cleaner solution and work to be cleaned is the prime requisite to displace oil films. The oil must be pried off the surface of the work before emulsification and deflocculation occur. Enthone Cleaner 100 is an outstanding detergent for steel surfaces because powerful surface active forces are quickly brought into play. Case histories prove successful cleaning where other detergents fail. Cleaner 100 is the ideal medium for cleaning steel by soak, tumbling or electrolytic methods.

*New literature available on request.*

THE ENTHONE COMPANY ENTHONE 444 Elm St., New Haven, Conn.

# CLEANER-100

A MODERN FAST ACTING ALKALI CLEANER FOR STEEL

# NEW EQUIPMENT AND SUPPLIES

NEW PROCESSES, MATERIALS AND EQUIPMENT FOR THE METAL INDUSTRY

## Kocour Automatic Dropping Unit

A new automatic dropping unit has been announced by Kocour Company, Dept. MF, 4724 S. Christian Ave., Chicago 32, Ill. The automatic dropping mechanism pictured here embodies the principles of the Hull & Strausser Drop Test for determining the

thickness of cadmium, zinc, copper and tin deposits but without the necessity of regulating the dropping rate, as it is fixed to deliver 100 drops per minute. A counter indicates the number of seconds elapsed and an adjustable arm fastened to the side of the cabinet holds the dropping tip in the desired position.

The solution is fed by a siphon arrangement directly from the standard liter size bottle placed in the cabinet, and once the set is put into operation, tests may be started and stopped by merely flicking a conveniently placed switch.

The set is compactly assembled in a well made cabinet which can be easily mounted on a wall or upright, convenient to a 110 volt, 60 cycle, A.C. electric outlet.

A counter is mounted on the panel so that the operator, after preparing and placing the specimen, simply notes the total at the beginning and again at the end of the test. The difference is the number of seconds required for the solution to penetrate the plate and the thickness can quickly be determined by referring to the appropriate factor. This eliminates the use of a stopwatch or other timing device. Convenient factors and charts are supplied with the instrument.

## Pennsalt Cleaner EC-10

Pennsalt-Cleaner EC-10 is a new organic type cleaner produced by the Pennsylvania Salt Manufacturing Company, Dept. MF, 1000 Widener Bldg., Philadelphia 7, Pa. This metal cleaner employs a new principal, as a result of which it removes soil which alkaline cleaners hardly touch in the short time usually allotted for cleaning. It is especially adapted for the quick removal of drawing compounds or cutting oils in a single operation.

## Face Shields

The new "Hundred" series of Face Shields, designed about the primary motive of comfort for the wearer, announced by the Boyer-Campbell Co., Dept. MF, 6540 St. Antoine St., Detroit 2, Mich., also retains the characteristic of all B & C Face Shields of complete interchangeability of parts. There are "100", "200", "300", and "400" models, each of them being identified by a variance in design of the head gear. Then for each model of face shield, there is a choice of three different thicknesses and three different sizes of cellulose acetate general purpose windows . . . three different sizes of 24-mesh screen windows for heat protection and a fiber front for scarfing and welding. The complete interchangeability of these parts makes practical a face shield for any industrial use with a minimum of stock.

Note that the back head band, in the "Hundred" series, is worn low on the head and is completely adjustable for snug fitting to any size of head in either the elastic head band (models 100 and 200) or the all-fiber head band (models 300 and 400) types. In this manner, the weight of these shields is evenly distributed over the entire head gear with the result that there is no sense of burden or unbalance, no matter how long it may be worn by the wearer. It can be said that it has a full-floating suspension.


## Professional Directory

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"Electro Chemical Technology"
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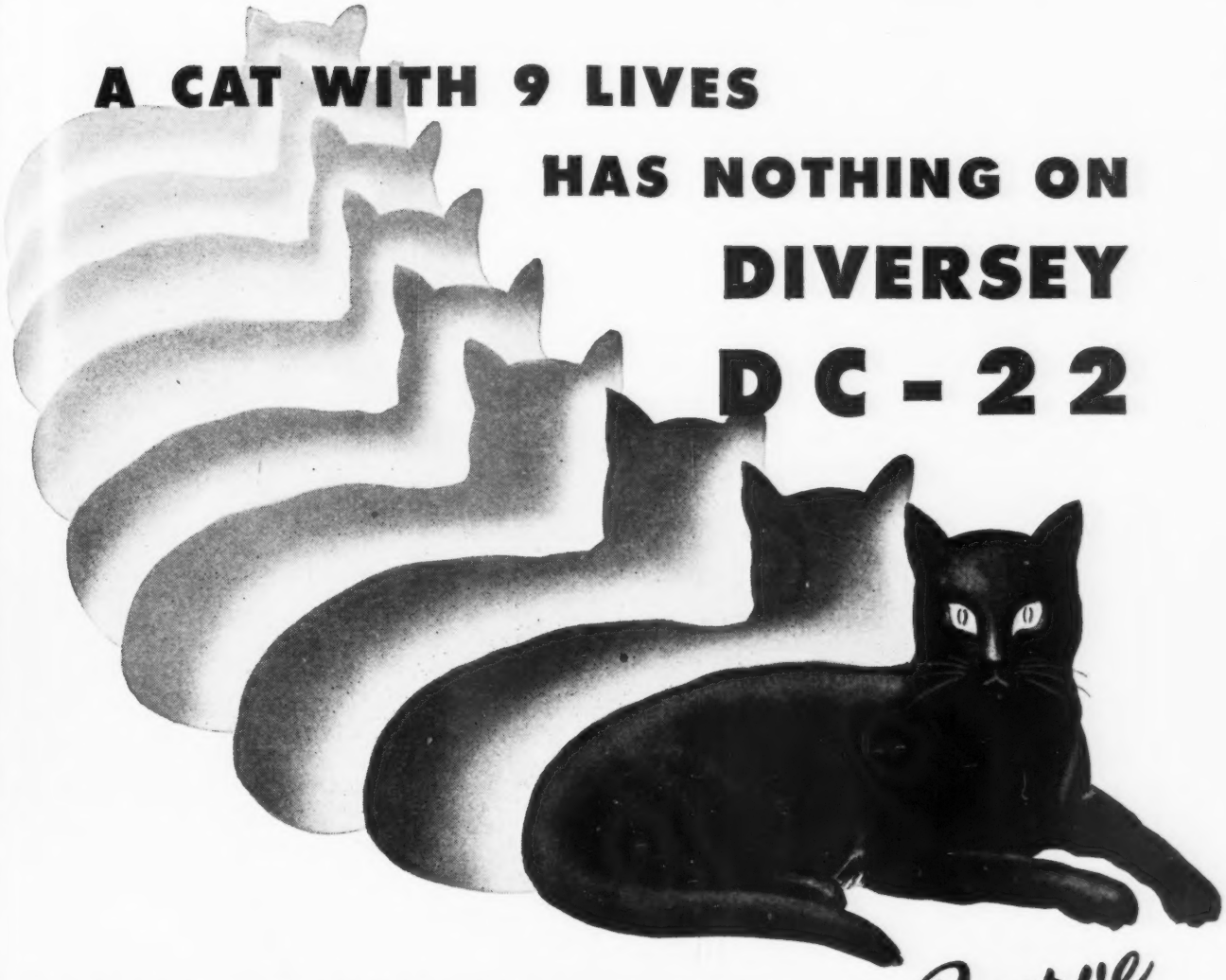
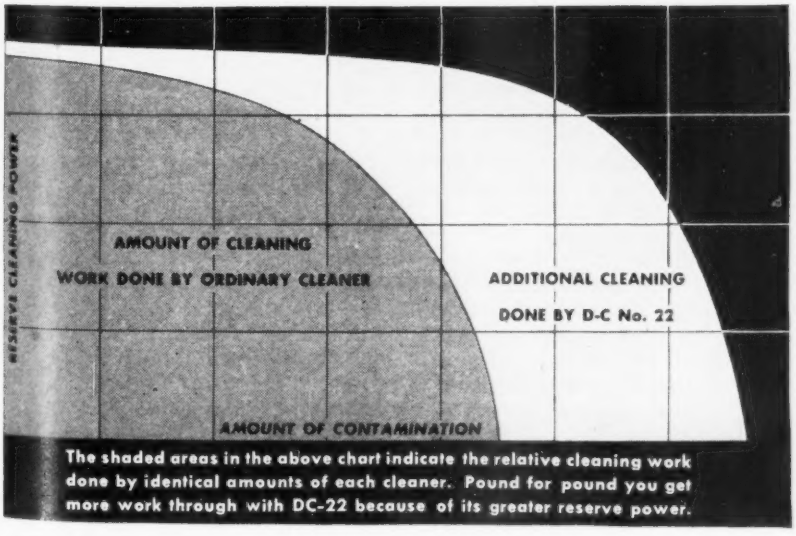
JOSEPH B. KUSHNER, Ch.E.
*Metal Finishing Consultant*
War plating plants designed and streamlined for increased production.
LA 4-9794 233 W. 26th St.
New York City

# A CAT WITH 9 LIVES HAS NOTHING ON DIVERSEY D C - 2 2



## THIS HEAVY DUTY CLEANER FOR IRON AND STEEL HAS *Reserve Power*




The shaded areas in the above chart indicate the relative cleaning work done by identical amounts of each cleaner. Pound for pound you get more work through with DC-22 because of its greater reserve power.

When it comes to long-life, the legendary cat with 9 lives has nothing on DC-22. This heavy duty cleaner for iron and steel has unusual reserve power . . . maintains peak cleaning strength even with large amounts of contamination in the solution. More economical . . . because pound for pound you get more work through with DC-22.

A vigorous, heavy duty cleaner, Diversey DC-22 quickly and completely removes all types of solid dirt, oil and grease from iron and steel prior to subsequent operations such as pickling and before and after heat treat. Unusual cleaning action is made possible by superior saponifying, emulsifying, wetting and penetrating power. A dry product, completely soluble in water, DC-22 readily provides a solution of the required strength for tank cleaning.

*For liberal experimental sample write Metal Industries Department*

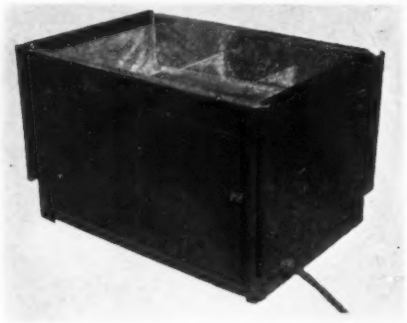
**THE DIVERSEY CORPORATION**
**53 West Jackson Boulevard, Chicago 4, Illinois**

**HELP WANTED? JUST CALL A**

**DIVERSEY D-MAN**

## Metal Parts Washer

The Phillips Manufacturing Company presents a three-stage metal washing tank with several new features. Designed for use with an emulsifying cleaner or as an alkali washer



it comprises a heated solvent tank with two heated water rinse tanks.

The heated solvent tank offers a thermostatically controlled range from 135°F to 250°F and a drain board which conducts the "drag out" solvent back into its tank. After immersion in the cleaning agent and draining, the parts are immersed in the first, then the second rinse tanks, emerging, finally, completely oil and dirt free. The water rinse is also heated, with a controlled flow that keeps the temperature at about 180°F, and an ingenious arrangement provides for the removal of most of the dirt and oil in the first rinse so that the final one produces oil-free work. The solvent tank is heated by strip heaters and the water rinse by immersion heaters. The heated tank's walls are insulated and working parts are easily accessible. Two safety covers hang at the side of the tank when not in use and protect the operator from contact with the tank itself.

Complete information may be had upon request to Phillips Manufacturing Company, Dept. MF, 3402 West Touhy Ave., Chicago 45, Ill.

## Harco Abrasive Cone

The Harco Abrasive Cone is a flexible abrasive device that exerts equal pressure at all points in a cylinder or tube; thus, it grinds, finishes, or deburrs, removing stock evenly. It is designed to efficiently do many operations and will be found to be extremely efficient where slotted abrasive discs have been and are now being used for deburring or chamfering the edge of a hole. It is made so any size cone can be assembled from die cut sheets, in sizes from ¾" x 2" to 15" x 16" and in grits from 24 to 320 aluminum oxide grain. It operates in any hole from ⅜" to 8" inside diameter. The mandrels are separate and each mandrel will handle several sizes of cones. Quick change-over is provided for by the use of only one Allen key in connection with the patented precision made mandrel; the cone sheets, when assembled, are in perfect balance.

The Harco cone is ideal for all deburring, grinding or finishing internally. Centrifugal force insures tremendous force against side walls; therefore, uses more grinding surface on the work. It has been tested up to 50,000 R.P.M. on smaller sizes.

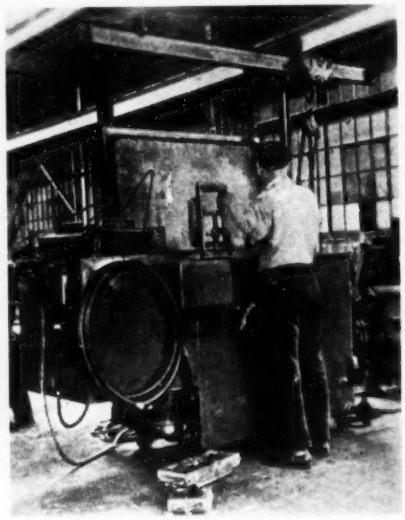
Anyone can assemble a Harco cone in a jiffy, as needed. All that is necessary is the right size mandrel and the right size and grit die cut sheets. Operates on lathes, drill presses, flexible shaft and air and electric motors. Send for full information and prices, to *Harco Products Company*, Dept. MF, General Sales Offices, 1414 So. Michigan Ave., Chicago 5, Ill.

## Standard Dip Cleaning Machine

Dip cleaning in still tanks is generally practiced where production requirements are moderate. However, by adding strong mechanical agitation to the soaking, the time of cleaning may be reduced by more than half.

For that reason, a new portable dipping and agitating cleaning machine (Type TA) has been developed by the Optimus Equipment Co., Dept. MF, Matawan, N. J. This machine is also recommended for other operations, including paint stripping, rust-proofing and other chemical treatments.

Essentially the machine is a strongly built tank (with insulation optional) with a cleaning door, drain cock, thermometer, inlet



cock and dirt basket. The work is agitated vertically by a mechanism which moves it up and down, in and out of the cleaning solution. This results in a "brushing" action, during which the cleaning liquid hits the surface of the work as often as 30 times per minute. The cost of this agitation is low, less than 2c per hour for a 600 lb. load. A removable frame supports the basket or the parts to be dipped in the solution and is attached to a sturdy shaft resting on two large flanged bearings. The part of the frame outside of the tank supports the motor and speed reducer which act as a counterweight to the work, thus balancing the load. This whole assembly—motor, reducer, bearings and frame—is removable as a unit.

A similar machine, specially designed for heavy loads and difficult cleaning jobs, is provided with two tanks and one agitation motor. The tanks are separated to avoid thermal exchange if the temperatures used are not equal.

Any cleaning agent may be used. Parts can either be sprayed, dipped or both, since the machine is equipped with pump, hose and nozzle for special jobs, and can be handled in baskets, racks or individually. Overhead track and thermostatic control are optional.

## Skin Protection

Mine Safety Appliances Company has announced the addition of FEND-U, FEND-F, and FEND-PC to its FEND group of protective creams and lotions.

FEND-U is a lotion which forms a semi-water repelling barrier on the worker's skin against all types of cutting oils and cooling compounds, kerosene, carbon tetrachloride, tetrachlorethylene, benzol, other solvents and degreasers, mild acid and mild alkaline solutions, alcohols, and acetates.

FEND-F is a water soluble heavy duty lotion which helps guard against dermatosis from aluminum, magnesium and zinc dusts; forms an effective barrier against Fiberglas, sharp particles, fruit and vegetable fuzz, chlorinated solvents.

FEND-PC helps reduce nervous perspiration where this is the cause of skin irritation—thus helping to prevent rusting of polished metal surfaces through contact with skin moisture. It is a water soluble cream which protects the skin against dust-borne irritants, grime, grease, dirt.

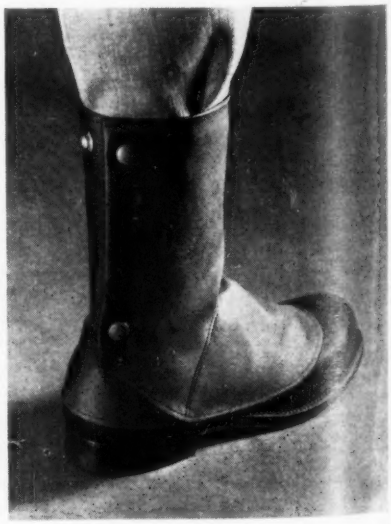
FEND Creams and Lotions, according to Mine Safety, form a protective physical barrier on the skin against scores of irritants encountered in industry. They are simply rubbed onto the exposed skin, before work, and are easily removed with mild soap and warm water at work's end. There are now nine FEND types, including the three new additions. Descriptive literature, including a detailed application chart, is available on request from Mine Safety Appliances Company, Dept. MF, Braddock, Thomas & Meade Sts., Pittsburgh (8), Pa.

## Ankle Protection

Ankle and foot protection against acids, alkalis, oils, solvents and greases is provided by a new spat announced by the American Optical Company, Dept. MF, Southbridge, Mass.

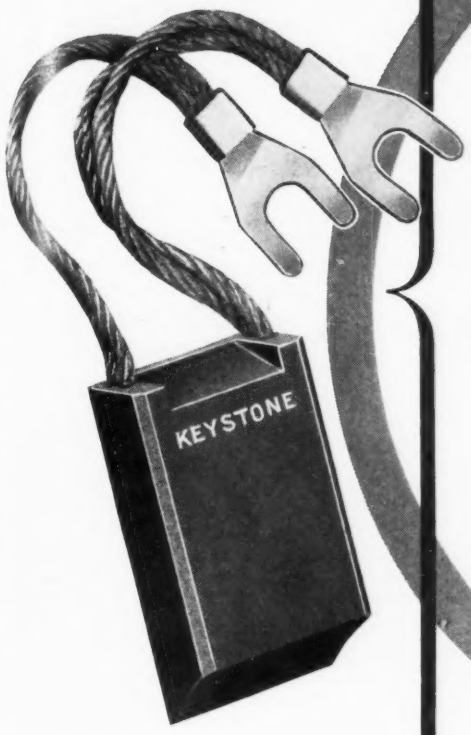
The spat is made from a coated fabric which gives the same protection as rubber but is much lighter in weight and extremely flexible.

Three snap fasteners at the top and two at the bottom make the spat easy to put on



and adjust, and assure quick removal. An elastic strap fits under the instep. Large flare assures over-all protection of instep.

# Avoid Ring And Commutator Cutting




*use*

# KEYSTONE METAL-GRAPHITE *Brushes*

KEYSTONE Metal-Graphite Brushes practically eliminate ring and commutator cutting, due to their low friction characteristics. This fact, together with their high current carrying capacity, low contact drop and excellent lubricating qualities, has been instrumental in their remarkable success on slip ring and commutator applications.

The result of years of research and practical experience, Keystone Brushes are demonstrating their ability to meet the more recent requirements of higher current carrying capacity, less friction and lower operating costs. They are made to meet the requisites of the machine on which they will operate. Copper and graphite are carefully proportioned to assure dependable electrical energy at all times. The shunts are molded directly into the brush, establishing a perfect connection for maximum performance in motors and low voltage generators.

Prompt delivery of Keystone Brushes for standard makes of equipment can be made. Our Research Department and experienced engineers are prepared to assist you with recommendations for specialized applications.

*Write today for our catalog and price list K-15.*

**KEYSTONE CARBON COMPANY, INC.**

*Manufacturers of Precision Molded Products*

1935 STATE STREET, SAINT MARYS, PENNA.

### Iridite in New Colors

Rheem Research Products Incorporated, Dept. MF, 2523 Pennsylvania Ave., Baltimore 17, Md., the developers of the Iridite process for rendering zinc and cadmium surfaces highly corrosion-resistant has developed Iridite in several new colors, it has been announced by Dr. R. M. Thomas, Vice-President of the Company.

These new colors include Maroon, Blues, Greens, Bronze and Blue-Black.

With the exception of Bronze, all colors are applied by the dips—a first for the basic coating and a second dip in a dye-bath. Iridite Bronze is a one dip basic coating.

Because the basic Iridite coating possesses excellent qualities as a paint base, the new Iridite colors can be clear lacquered for even greater durability.

### Industrial Aprons

A line of lightweight laboratory and industrial aprons made with high grade cotton fabric and a vinyl resin coating is announced by The B. F. Goodrich Company, Dept. MF, Akron, Ohio.

The aprons are particularly well suited for operations in laboratories, battery shops, metal platers, dairies, tanneries, canneries, machine shops and on the farm.

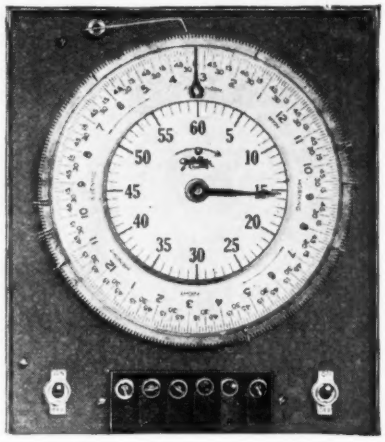
The vinyl resin coating makes the aprons waterproof, acid proof, alkali proof, oil and grease resistant. They are flexible, constructed with hemmed edges, reinforced neck and waist tapes, and are in two sizes, 35 inches wide by 45 inches long, and 29 inches wide by 35 inches long.

### Program Timer

Synchronous motored for the greatest possible accuracy of signals at any 5-minute period in a 24-hour schedule, with circuit closure from 5 to 60 seconds precisely at the time specified, the new Zenith Program Timer, is an example of simple, compact construction to meet today's demand for timing precision.

It is designed for numerous uses, in factories, airports, railroads, schools, hotels and many other institutions.

This new Zenith Timer is an automatic




switch which can be set to close an electrical circuit at any desired 5-minute interval as often as desired. As many as 288 operations a day are possible.

The program mechanism is set automatically by turning the minute hand as on an ordinary clock. The schedule is easily changed any time without the use of tools.

Rating 10 amps., at 110 volts. Steel case is 8" x 12" x 4".

Further details may be had by addressing Zenith Electric Company, Dept. MF, 152 W. Walton St., Chicago 10, Ill.

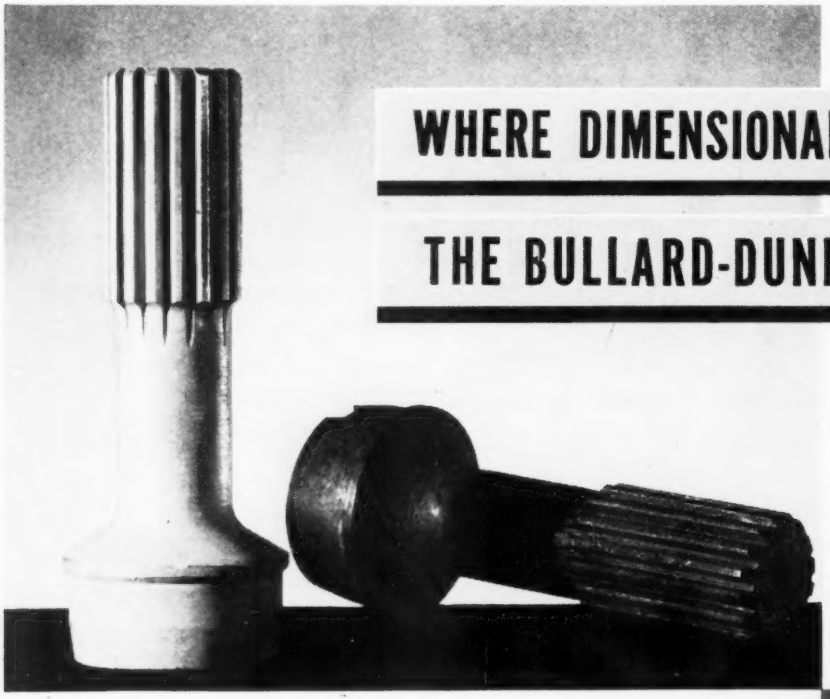
### Electro Plastic Processes

The unusual adhesion obtained by Electro Plastic Processes in plating on plastic materials has been further adapted for application to glass and ceramics. Laboratory and field tests indicate greatly improved hermetic sealing. Tests on pyrex glass have been conducted by heating the solder sealed piece to 350° F. and immersing it immediately into dry ice, indicating the adaptability of the new process for all temperature ranges. Adhesion obtained is much better than that of other commonly used methods.

Any normal soldering method is satisfactory—hot iron, oven soldering or electronic, and no special solders are required.

The process is adaptable to the hermetic sealing of such electrical components as resistors, condensers, small relays, transformers, instruments, etc. Either glass or ceramic cases can be plated with a metallic band for soldering to metallic end caps or insulators plated for solder sealing to metallic containers.

Details may be had by addressing Electro Plastic Processes, Dept. MF, 2035 West Charleston Street, Chicago 47, Ill.

WHERE DIMENSIONAL CHANGE IS *out*

THE BULLARD-DUNN PROCESS IS *in*

**NOTE THESE OTHER ADVANTAGES**

★ Fast
★ Economical
★ Labor saving
★ Easy to operate
★ Long Solution life
★ Produces chemically clean surfaces
★ No etching

Among the reasons for the widespread use of the Bullard-Dunn Process in plants which descale gears, dies and precision threaded parts is the fact that it does not attack the base metal. Also, by its high "throwing power" it removes scale completely from tiny recesses and internal surfaces.

These unique advantages, coupled with its greater speed, make the Bullard-Dunn Process indispensable for production where time is at a premium and accurate work a necessity. Send samples of your work for an estimate. Write for booklet today.

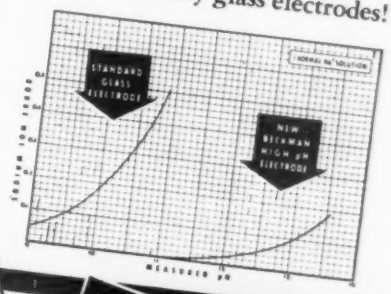
BULLARD-DUNN *Process*
A DIVISION OF THE
THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

# Check your knowledge of pH

## Do you know the answers to these important pH questions?

**Q.** *There is only ONE make of modern pH equipment with which accurate pH measurements can be made in highly alkaline solutions, even in the presence of sodium ions. Do you know what that make is?*

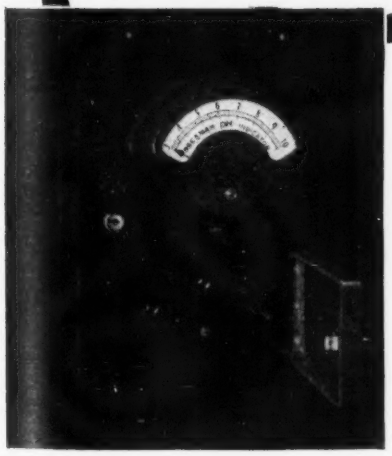
**A.** Beckman pH equipment—and *only* Beckman equipment! Note in chart the accuracy of Beckman Type E Glass Electrode in highly alkaline solutions compared with ordinary glass electrodes!




**Q.** *There is only ONE make of pH equipment with which glass electrode pH measurements can be made in boiling hot process solutions. Do you know the name of this equipment?*

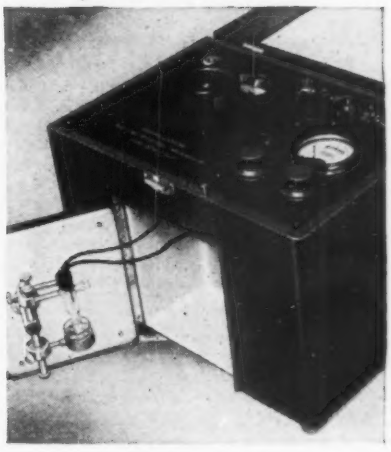
**A.** Again Beckman—and *only* Beckman! With Beckman High Temperature Glass Electrodes, continuous pH measurements can be made in solutions as hot as 100°C (212°F). This feature is highly important to consider in the purchase of pH equipment for *any* purpose. Even though your present operations may not involve hot solutions, you never know when changes or additions to your operations may obsolete equipment not providing this feature. Buy Beckman to begin with *and be sure!*

**There's a Beckman pH instrument for your requirement.**



**Beckman Automatic pH Indicator**
The most advanced pH instrument available for large-scale pH control. Indicates pH completely automatically. Also operates pH recording and control equipment!

**Beckman Industrial pH Meter**
Combines high accuracy with knockabout ruggedness for portable plant and field use. Gives instant pH readings at the touch of a button. Also *continuous* indication!



**Beckman Laboratory pH Meter**
Combines high precision with wide versatility to meet every laboratory and research need.

**Free! "What Every Executive Should Know About pH"—a helpful factual guide to modern pH control. Send for your copy.**

BECKMAN INSTRUMENTS NATIONAL TECHNICAL LABORATORIES
South Pasadena • California

BECKMAN INSTRUMENTS CONTROL MODERN INDUSTRIES

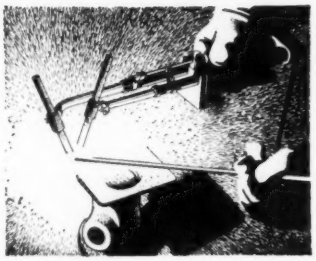
## New 9000° Arc Torch Can Be Used for Welding and Brazing All Ferrous and Non-Ferrous Metals and Alloys

**Now** an arc torch that makes it possible to do most jobs *electrically* that previously were thought possible only with gas. This attachment for arc welders provides an independent source of heat by means of two carbons. It is capable of producing intense heat, approximately 9000° F., over 2000° hotter than an oxyacetylene flame. Pure heat, no oxygen or gas to contaminate the weld. No pressure to force the molten metal away or blow holes in light sections.

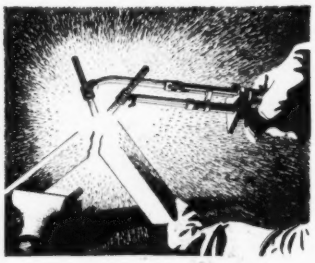
**Developed** to capitalize to the fullest on the time-saving advantages of electric welding, the new Mid-States 9000° arc torch can be used with any AC or DC electric welder. It opens up new horizons of service in this field, never before possible with an electrically operated instrument.

New uses are being found every day for products that have been familiar to us for years. Wrigley's Spearmint Gum, always enjoyed for its chewing satisfaction, is now proving with the fighting men overseas many benefits which will be useful to you in peacetime. One of the big factors in mass production is the alertness and efficiency of the man on the job. The chewing of Wrigley's Spearmint will help keep you alert and wide-awake during those work periods that, while seemingly dull and monotonous, call for watchfulness in order to get perfection in the final assembly.

*You can get complete information from Mid-States Equipment Co., 2429 S. Michigan Avenue, Chicago 16, Illinois.*



For BRAZING Steel, Cast Iron, Malleable Iron, Copper, Brass, Bronze, and other ferrous and non-ferrous metals.



For HEATING to Straighten or Bend, etc.

Y-168

# Business Items

Five new district representatives have been employed by the Metal Industries Department of *The Diversey Corporation*, Chicago. Following are listed the names of these representatives and the areas which they will serve:

*A. D. Scobie*, Cincinnati, Ohio; *C. D. McConkey*, Cleveland, Ohio; *W. G. Yokel*, Connecticut; *W. H. McKeever*, Philadelphia, Pa., and *H. G. Grabill*, Grand Rapids, Mich.

*Pennsylvania Salt Manufacturing Company* announces the following additions to its Research and Development staff:

*Miss Isabella A. Romans*, formerly with Chloramine Corporation; *Dr. George McCoy*, formerly instructor of Organic Chemistry at the University of Pennsylvania; *Mr. Ward W. Whitebread* of General Chemical Company; *Mr. Harry Green* of Lion Oil Refining Company; *Mr. Savin Zavarella* of Pratt Whitney Aircraft Corporation; *Mr. Harold B. Staley* of Cochrane Corporation; and *Dr. Frank W. Panepinto* of the Warner Company.

New staff members also include *Miss Mary F. Hensler* and *Miss Helen Cunningham* of the College of Chestnut Hill and *Miss Mildred E. Raesler* of Pennsylvania State College.

*L. K. Lindahl*, president of the *Udylite Corporation*, Detroit, announces the appointment of *L. V.* (*"Larry"*) *Nagle* as Vice-President in Charge of National Sales for that company.

L. V. Nagle

Mr. Nagle has been active in the metal finishing field for over seventeen years, having been Michigan Sales Manager for the Udylite Corporation for the last thirteen years.

"Larry" is a member of the class of '26 University of Detroit, and is widely known throughout the trade for his activities.

His broad knowledge of metal finishing was gained by first hand acquaintance with platers and their problems.

*Donald C. Blum*, third generation member of a well known Rochester family of electroplaters, has been made Udylite's Service Engineer for Buffalo, Rochester area with headquarters at 672 Mt. Read Boulevard, Rochester, N. Y.

Donald C. Blum

As Secretary and Treasurer of the *Rochester Branch* of the *American Electroplaters' Society* for the past two terms, and through his years of active occupation in electroplating, he has acquired a wide acquaintance and respect among the platers in this territory.

A shift in personnel designed to maintain service to customers is announced by *The Osborn Manufacturing Company*, Cleveland, Ohio, world's largest manufacturer of brushes for industry.

R. B. Jones

*R. B. Jones* has been assigned to help in scheduling production and shipments, according to *M. C. Pecsok*, sales manager of Osborn's brush division. Mr. Jones has covered the Cleveland sales territory.

*Page A. Mead*, assistant in Osborn's market development work, will replace Jones

Page A. Mead

in the Cleveland territory, Pecsok said, in announcing promotions for the two men.

---

At a dedication luncheon held October 4, 1944 in the new Research Laboratories of the *Pennsylvania Salt Manufacturing Company* at Whitemarsh, Pa., *Mr. Leonard T. Beale*, President of the Company presented the key to the Laboratories to *Dr. S. C. Ogburn, Jr.*, Manager of Research and Development and head of the Whitemarsh Research Laboratories. The guest speaker at the luncheon was *Mr. C. F. Kettering*, General Manager, *General Motors Corporation*, Research Division. Prominent figures in the world of science, industry, publishing and education attended.

After the luncheon, guests were conducted through the extensive laboratories. The

UNICHROME*
"AIR DRY" RACK COATING

Easy to apply—but hard to wear off

A few dips in the handy, open-end drum—and your plating racks are coated with a tough, resilient insulation that you can count on to stand up through cycle after cycle of trouble-free operation.

The remarkable properties of the special resins used in Unichrome "Air Dry" Rack Coating account for its extreme resistance. Continuing research in selecting and formulating these resins gives you maximum protection at minimum cost . . . an insulating coating effective in all plating cycles where an air drying material can be used. Write to nearest office for prices or a trial order. *Reg. U.S. Pat. Off.

PROPERTIES

Chemical Resistance — Excellent for all plating cycles.

Toughness — Withstands repeated flexing and shop handling — cuts cleanly and easily at contacts.

Drying — Dipped in container in which it is shipped and dried at room temperature.

Adherence — Excellent.

UNITED CHROMIUM, INCORPORATED
51 East 42nd St., New York 17, N. Y. • 2751 E. Jefferson Ave., Detroit 7, Mich. • Waterbury 90, Conn.

TRY THESE OTHER UNICHROME MATERIALS

Unichrome Coating 202—a new rack insulation, similar to "Air Dry" but which is force dried to obtain the extra adherence required in anodizing and hot, strongly alkaline solutions.

Unichrome Quick Dry Stop-Off 322—for cyanide copper and other plating work requiring an extremely adherent stop-off.

Unichrome Quick Dry Stop-Off 323—for chromium and other plating work requiring a stop-off that can be peeled off after use.

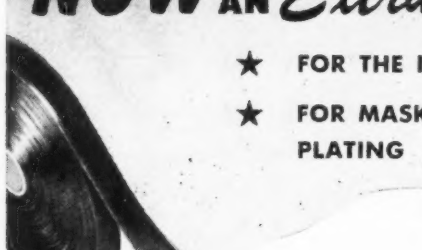
Unichrome Resist—a solid insulating material for constructing composite racks, stop-off shields, insulating gaskets, etc.

View of speakers' table at dedication luncheon.

# NOW AN *Extruded* MASKING TAPE

★ FOR THE INSULATION OF PLATING RACKS

★ FOR MASKING PARTS PRIOR TO SELECTIVE PLATING



Miccrotape rounds out the complete line of protective coating materials developed and produced by Michigan Chrome and Chemical Company for the insulation of plating racks and for masking parts prior to selective plating. Like other "Miccro Products" it was developed for use in our own plating plant . . . to provide qualities offered by no other tape used for similar purposes.

Miccrotape is the first tape of its kind to be produced by an extruding process. This results in a slightly curved surface which feathers out to uniformly light edges. This feature makes Miccrotape extremely easy to apply and permits unusually smooth over-lapping and a snug fit around every surface.

You'll be interested in the many other outstanding features of this tape and its unusual advantages for use on specific types of work. Full details will be sent you upon request.

MICCROTAPE

*Developed and Manufactured by Experienced Platers*

**MICHIGAN CHROME & CHEMICAL CO.**
6348 EAST JEFFERSON • DETROIT 7, MICHIGAN


*Whitemarsh Research Laboratories* have been converted from Whitemarsh Hall, the stately mansion of the late *Edward T. Stotesbury*. By the utilization of an existing structure suitable for conversion, the Pennsylvania Salt Manufacturing Company saved time, building materials, labor and expense in creating an effective group of laboratories to meet the needs of its expanding research and development progress, at present largely devoted to war work. By converting the Stotesbury mansion, the Company saved considerably over its original plans for newly constructed laboratories. The extensive grounds of Whitemarsh will be maintained, inasmuch as they are famous for their magnificence, being known as the "Versailles of America".

The formal opening of the Whitemarsh Research Laboratories extended over October 5, 6 and 7, when invited groups were conducted through the premises by members of the Research Staff of the Company.

---

*George Fay* has resigned as treasurer of the *Hydril Corporation*, Los Angeles, to become comptroller of the *Rheem Manufacturing Company*. Previously, Mr. Fay was comptroller of *Blair & Co., Inc.*, investment securities underwriters, and treasurer of *Nemours Trading Corporation*, a du Pont subsidiary.

---

*Mixing Equipment Co., Inc.*, of Rochester, N. C., manufacturers of Lightnin Portable Mixers and heavy duty Mixco Agitators, have announced changes in their sales organization of considerable importance to a large number of customers in the states of Indiana, Kentucky, Ohio and West Virginia, effective November 6, 1944.

The *Emerson Scheuring Tank & Mfg. Co.* of Indianapolis, Ind., manufacturers of stainless steel and special alloy vessels, will act as representative for Central Indiana.

The *White Industrial Sales & Equipment Co.* of Cincinnati, Ohio—*E. V. White*, president, will represent the company for Southern Ohio, Northern Kentucky and the western part of West Virginia, including Charleston. The portion of the West Virginia territory was formerly handled by Moorhead Company, Pittsburgh, Pa., and the New York City office of the Mixing Equipment Co.

Part of this territory was previously handled for many years by the *E. W. Buschman Co.* of Cincinnati, Ohio. This arrangement is now terminated by mutual consent.

---

Appointment of two new representatives and a territorial change effecting a third has been announced by *Wheelco Instruments Company*, Chicago.

*John G. Davison*, Denver, has been named Colorado representative, while *Olin Phillips*, Toledo, has been named in the northern Ohio territory. The state of Minnesota has been added to the territory served by *L. E. Cyrtmus*, Milwaukee.

---

A new industrial research and development organization, the *Pyrene Development Corporation* of Newark, N. J., has been formed as a subsidiary of the *Pyrene Manufacturing Company*, also of Newark, makers of fire extinguishing equipment and automobile tire chains.

The officers of the new organization, drawn from the executives and directors of the parent company, are *Charles G. Durfee*, president, *Edward J. Waring*, vice-president, and *Edward A. Clapp*, secretary and treasurer.

The new organization will not only carry out research on fire extinguishing equipment and compounds but will also work in the larger field of safety devices and other means for conserving life, health and property, according to Mr. Durfee. To ensure the continuance of a broad program, ideas from the public will be welcomed. An immediate project is the extension of the development of systems and equipment for employing the mechanical foam principle in fire extinguishment.

---

*F. H. Weismuller* has been appointed director of sales of the Pigments Department, *E. I. du Pont de Nemours & Company*. Mr. Weismuller, who was production manager, succeeds *John F. Daley*, recently made general manager of the department.

*R. A. Kaiser*, assistant production manager, will succeed Mr. Weismuller, and *C. E. Rossee*, manager of the Baltimore, Md., pigments plant will be transferred to Wilmington to become assistant production manager.

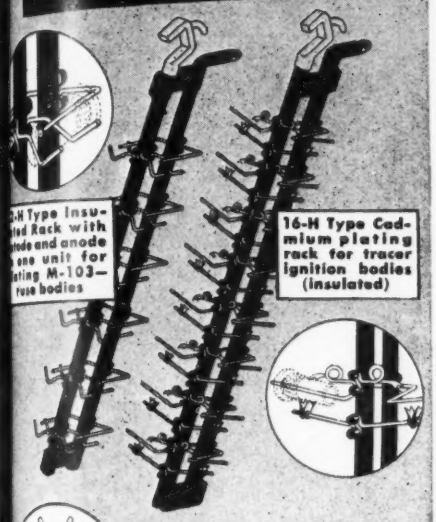
*C. E. Smith*, in charge of silica gel operations at the Newark, N. J., plant, will suc-

*Insist On Genuine*

# BELKE PLATING RACKS

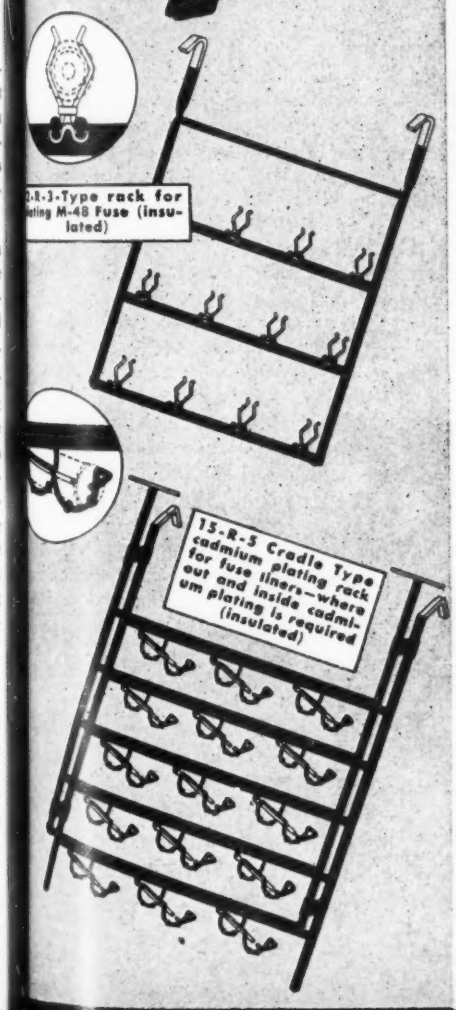
*New — Wonderful Synthetic Insulation*

**FOR ANODIZING**



-H Type Insu-ted Rack with ode and anode one unit for ting M-103— use bodies

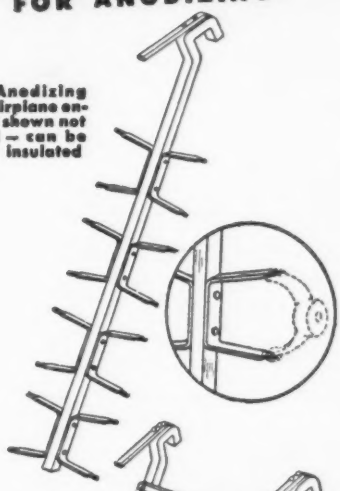
16-H Type Cadmium plating rack for tracer ignition bodies (insulated)



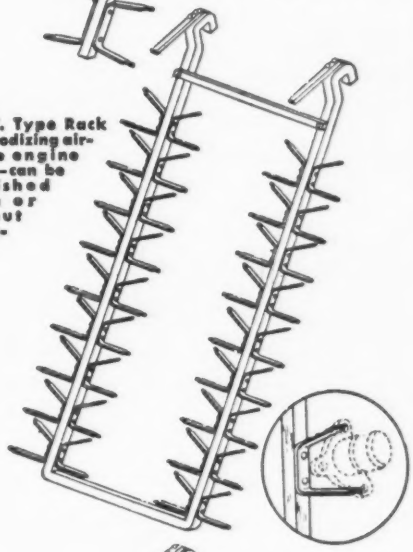
-R-3-Type rack for ting M-48 Fuse (insulated)

15-R-5 Cradle Type cadmium plating rack for fuse liners—where out and inside cadmium plating is required (insulated)

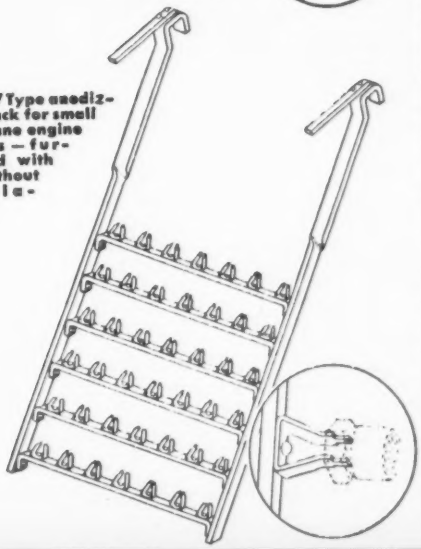
8-H Type Anodizing Rack for airplane engine parts shown not insulated — can be furnished insulated

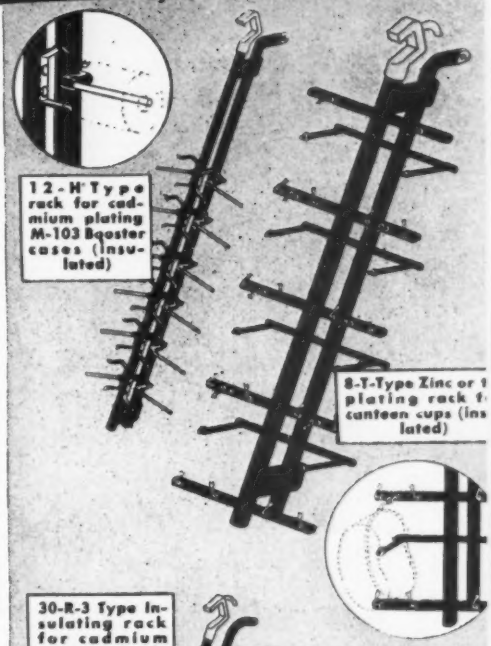


36-LV. Type Rack for anodizing airplane engine parts—can be furnished with or without insulation



42-R-7 Type anodizing rack for small airplane engine parts — furnished with or without insulation

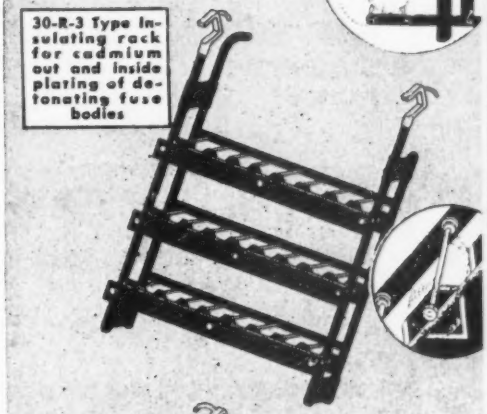




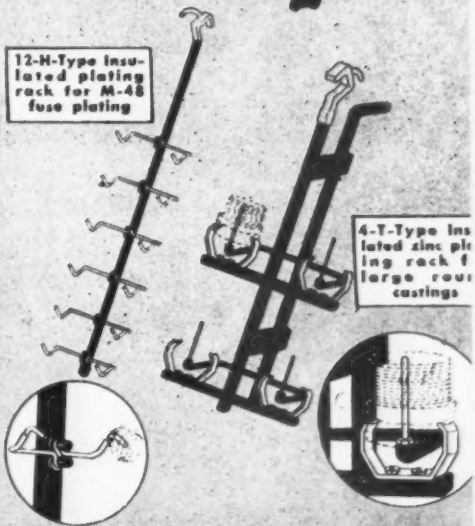
12-H Type rack for cadmium plating M-103 Booster cases (insulated)

8-T-Type Zinc or t plating rack f canteen cups (ins lated)

30-R-3 Type insulating rack for cadmium out and inside plating of detonating fuse bodies



12-H-Type insulated plating rack for M-48 fuse plating



4-T-Type Ins lated zinc pl ing rack f large rou castings

**BELKE MANUFACTURING COMPANY**
**947 NORTH CICERO AVENUE · CHICAGO**

# Stop Off— for hard chrome

If you are plating hard Chrome you should know more about BUNATOL 474 Red Stop Off.

Here is a highly specialized product made for this particular application that combines all the good points that every Plater wants in a Stop Off.

No. 474 Red air dries very fast leaving an easy to trim hard film with great adhesion. It holds on the edge and does not plate back or tree. Applied by brushing or dipping and stays right where you put it without bridging on irregular surfaces. A single coat leaves a heavy dense film with high dielectric value and great chemical resistance.

Why not test this Stop Off on your work? A note on your letterhead will bring a sample can immediately.

NELSON J. QUINN COMPANY

TOLEDO 7, OHIO

**BUNATOL**

ENGINEERED INSULATION


ceed Mr. Rossee. All organization changes are effective immediately.

Mr. Weismuller has been with the Du Pont Company 18 years. He was born in Brooklyn, N. Y., and was graduated from Cooper Institute in 1922 with a B.S. in chemical engineering.

---

The recently completed chemical finishing laboratory in the Chemical Engineering department of the *Lyman Cornelius Smith College of Applied Science*, Syracuse University, was the setting for a reception given in honor of officials of the *Du-Lite Chemical Corporation* of Middletown, Conn., Wednesday, Oct. 18. The company representatives visited the campus to discuss progress on a fellowship in chemical finishing of metals which the Du-Lite Corporation awarded the college in July.

The laboratory is the only one of its kind in central New York, according to *Nelson F. Murphy*, assistant professor in chemical engineering and advisor to the fellowship. Products of several local industries, chemically finished in the laboratory, and other plated and polished articles and cleaners for pre-cleaning metal surfaces were on display at the reception.

---

The *DeVilbiss Company* announces the removal of its Cincinnati District Sales Headquarters to 410 American Building, Central Parkway and Walnut Street.

*Dr. Hendrik van der Horst* examines a liner he chrome-plated five years ago at his plant in Holland for a Dutch motorship. The vessel was sunk during the early days of the war and remained on the bottom for

two weeks. After it was raised, the original liners continued in service for a total of some 300,000 miles of ocean travel before being returned for reprocessing at one of the two Van der Horst plants at Olean, N. Y.

---

*Gilbert D. Dill* has been appointed a member of the sales engineering staff of *American Foundry Equipment Co.*, Mishawaka, Ind. He will be engaged in the development and application of Wheelabrator airless abrasive blast cleaning equipment in the rolling mill industry.

Mr. Dill was last employed as purchasing engineer for Arthur G. McKee & Co., Cleveland, in charge of purchases involved in the construction of two wartime steel plants. He also holds patents on several important industrial developments including the Brassert Stationary Disintegrator for gas and oil reactions, which is widely used in the steel and chemical industries for dust collection absorption and other reactions.

---

"BUT, DAD, HAROLD'S A CORPORAL AND HE SAYS THE GOVERNMENT WANTS US TO SAVE ELECTRICITY."

# Associations and Societies

## American Electroplaters' Society

### Pittsburgh Branch

The *American Electroplaters' Society* during the Annual Conference held in Cleveland last June, chose Pittsburgh as its Conference City for 1945.

Within a few days after being notified that it had been, for the first time in its history elected to play the role of host, the Pittsburgh Branch held a meeting of its Board of Managers and Officers. At this session, the Board of Managers selected *S. S. Johnston* who is the present president of the Branch for the General Chairmanship of the Conference Committee.

Mr. Johnston, who is an electrochemical technician at the *Weirton Steel Company* immediately formed the nucleus of his committee. His selection includes:

***Educational Chairman***

*R. A. Dimon* of Carnegie Illinois Research Labs.

***Hotel Reservations***

*J. L. Wray* of Egyptian Lacquer Co.

***Registration***

*Leo J. Schmitt* of Cowan Manufacturing Co.

***Publicity Chairman***

*W. J. Hennessy* of Pennsylvania Salt Manufacturing Co.

***Entertainment and Banquet***

*H. F. Saylor* of Cowan Manufacturing Company.

***Transportation***

*R. O. Hummel* of Harshaw Chemical Company

***Ladies Committee***

*Mrs. Richard A. Dimon*, Pittsburgh

***Exhibits***

*Wilfred S. McKeon* of Sulphur Products Co.

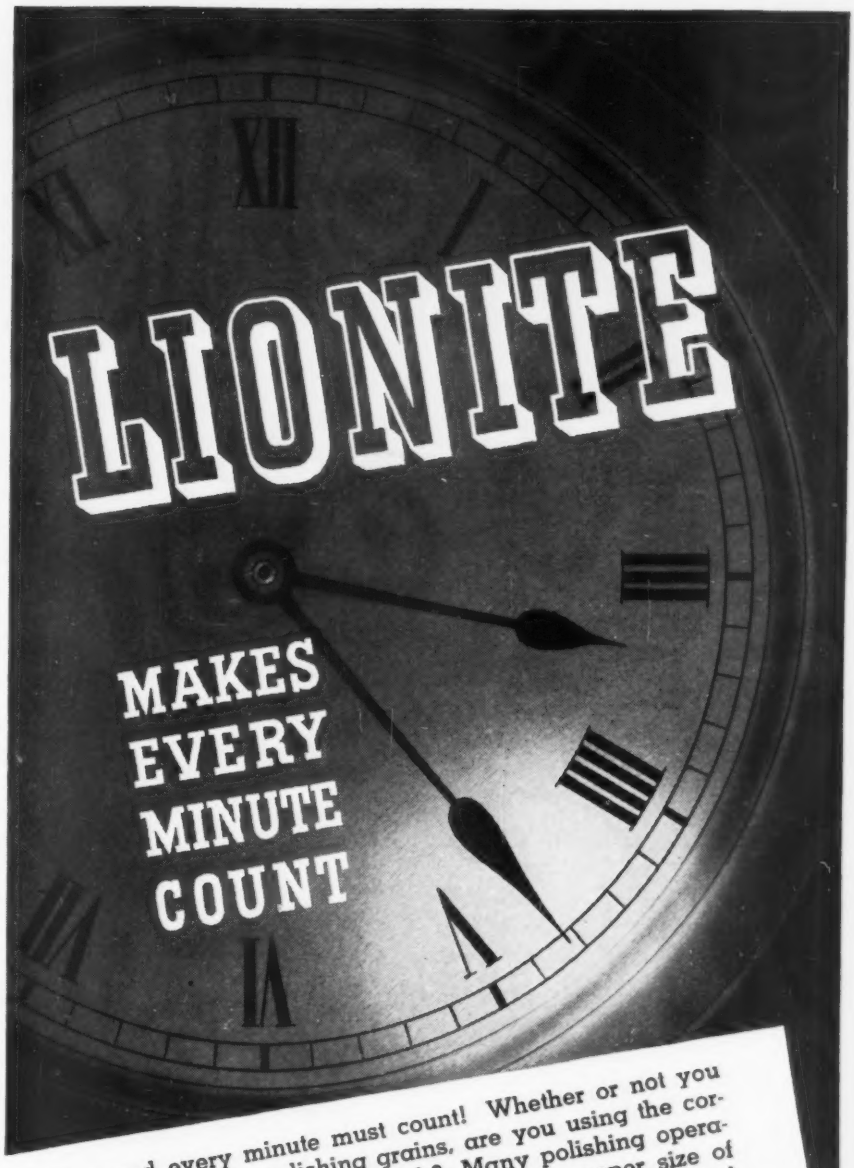
***Secretary & Treasurer***

*Frank R. Keller* of Standard Steel Springs Co.

Mr. Johnston, his Committee Chairmen, and *Mr. Charles Shaeffer* of the *Pittsburgh Convention & Tourists Bureau* have already had two conferences with the Officers of the National Society. Added encouragement was given to the local committee by the fact that every one of the National Officers attended at least at one of these meetings.

The Pittsburgh Committee has been mostly concerned with matters pertaining to general policy thus far, but is about to launch itself into the details of practical formulation. Each month the branch will publish a sentence describing one of the objects it hopes to attain in making this conference specifically interesting to the A. E. S. members and friends who will be in attendance.

The present slogan states that Pittsburgh will endeavor to present all papers at the time scheduled, on the date scheduled and in the place scheduled.


Yes, and every minute must count! Whether or not you are using Lionite polishing grains, are you using the correct size of abrasive for the job? Many polishing operations are slow and laborious because the proper size of grain has not been selected. The following case selected from our files will illustrate this point.

Job—To clean and polish castings in one operation
Grain formerly used—Size 70 aluminum oxide
Grain now used—Size 46 NB Lionite with cement
Comments—Size 70 aluminum oxide was recommended by another grain manufacturer. Production was not only very slow but wheels loaded and work burned.

General Abrasive engineer recommended and tested size 46 NB Lionite which increased production many times over and all castings came through clean and with satisfactory finish.

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### Waterbury Branch

Waterbury Branch held its regular meeting at the Hotel Elton on Friday, November 10th. The technical session opened at 8 P. M., and as usual was preceded by dinner in the Colonial Room. In the absence of President *Tony Maz*, Vice-President *W. L. Cassell* presided.

The business meeting having been concluded, the program for the evening was turned over to the Technical Chairman, *Merle M. Wetzel*, who asked *Jack Hyner* to review the preprint of the paper "Devices for Controlling Distribution of Electrodeposits" by *C. J. Leadbeater*, which is to be published in Volume 19 of the *Journal of the Electrodepositors Technical Society*. The author covers very completely and very clearly various means of obtaining uniform current distribution in electrodeposition, and every one who is concerned with obtaining uniform plating on irregular pieces will find the paper very helpful.

"Synthetic and Engineered Corrosion Control" was the subject of a talk by *Mr. Donald F. Siddall*, Director of Research of the *U. S. Stoneware Co.* His talk was illustrated by three very interesting motion pictures in color.

Mr. Siddall summarized in his paper the types of material from a chemical viewpoint, which might be useful in combating corrosion. In the subsequent question period he elaborated on methods of application and types and kinds of plastic resins useful in the electroplating field for tank and equipment lining. His talk gave an insight into some of the newer materials which are now being used so successfully to protect equipment against corrosion by various acids and alkalis. The members all appreciated having the opportunity of hearing this talk, which should be of great assistance to everyone.

### Los Angeles Branch

Three veteran members of the plating industry collaborated to present Los Angeles Branch of the A.E.S. with a triple-header program of discussion on filtering of solutions at the November 13 meeting in the Rosslyn Hotel.

The speakers were *D. N. Eldred* of the *DuPont Co.'s* Pacific division; *Don Bedwell*, head of the *Bedwell Plating Co.*; and *Robert Gripp*, foreman of the *Cadmium and Nickel Plating Co.*

Mr. Eldred led off with a general discussion of filtering in which he outlined the basic purposes of filtering and described various types of filtering media.

He explained the functions and construction of such varying types of filters as the plate and frame model, cloth bags, filter pads, woven fibres, diatomaceous earth, etc. Mr. Eldred included some comment on filtering procedure, filter composition and types of tanks best suited for various types of solutions.

Mr. Gripp followed with a discussion of various filtering methods which the company which he represents has found practical over a period of many years.

The third speaker, Mr. Bedwell, pointed out that there are many impurities present in a plating shop which get into the solution

by accident. Some of the impurities may be present in the work itself, he said, and have not been removed during ordinary cleaning. These are the factors, Mr. Bedwell declared, which are instrumental in creating solution problems.

This speaker warned against the use of carbon unless conditions specifically indicate its use.

"When the organic processes begin to assert themselves in the solution, pits and other deficiencies develop in the work," Mr. Bedwell said. "Under such circumstances the use of carbon is the answer. Put the carbon in, stir repeatedly, let it settle and filter off through a well-packed filter, using filter aid. Guard against a leaking bag and do not start the flow into the tank unless the stream is absolutely clear. Carbon filtering is the only method by which rough plating and pitting can be avoided."

Mr. Bedwell emphasized there is no point in filtering a nickel solution unless the bag as well as the anode are thoroughly washed for complete removal of all impurities.

*Frank Bunker,* Branch secretary-treasurer, next delivered an extemporaneous talk on barrel buffing and burring. He distributed for inspection various items of work to illustrate one of the chief points brought out in his talk—that odd-shaped items can be successfully burred in a barrel containing burring material shaped and sized to get into the corners of the work.

At the business meeting, which was held at the close of the educational program, President *Joseph Sunderhaus* called for a vote on the question of whether the Branch should sponsor an annual educational session in 1945. The balloting was in the affirmative, and *Marcus Rynkofs* was thereupon named chairman of a committee to make arrangements for the session, selection of date and place to be left to the discretion of the committee, subject to approval by the membership as a whole at a later meeting.

---

### Toronto Branch

The November meeting of the Toronto Branch, A.E.S., held November 17th, in the Royal York Hotel was a double feature event. President *Allen Byers* presided. A chicken dinner served at 6:30 P. M., was enjoyed by 28 members. Several members arrived later for the Quiz program which followed. Quiz programs have proven quite popular with the members and this one in particular was unusually interesting, instructive and amusing. Considerable discussion relative to the various answers resulted. Over thirty prizes were awarded.

*Mr. F. C. Mesle* of Oneida, N. Y., was present and addressed the members regarding the *A.E.S. Research Committee* and the efforts being made to resume work for the improvement of metal finishes and the methods of producing them. As a result of the talk given by Mr. Mesle, Toronto Branch voted to give $125 toward the research fund.

During the evening Mr. Mesle also gave a talk on "Heavy Silver Plating."


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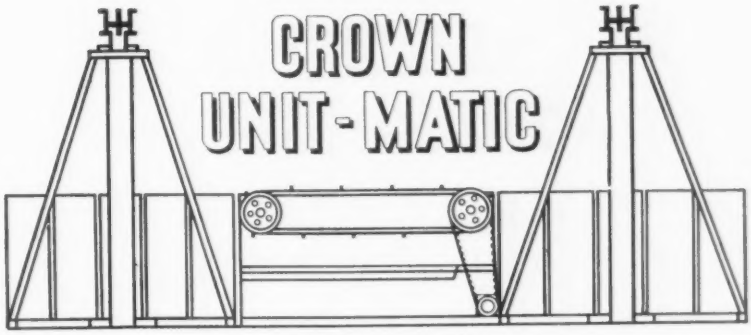


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# Manufacturers' Literature

### Degreasing and Cleaning

*The Penetone Company*, Dept. MF, Tenafly, N. J., has issued a new folder describing *Penetone* which is a liquid, water soluble degreasing and cleaning agent which is claimed to be entirely non-inflammable as well as non-toxic.

Copies may be obtained by writing to the company at the above address.

### Cleaning Die Castings

An informative, timely 12-page Digest entitled "*Production Cleaning of Die Castings*" has just been released by *Oakite Products, Inc.*, New York 6, N. Y., which, because of the high importance of preliminary preparation of die castings before finishing, should prove of particular interest to all users and commercial producers of die castings.

The Digest describes various cleaning techniques and materials for the surface preparation of aluminum, zinc, magnesium, brass, bronze, copper, lead or tin base die castings prior to the application of organic, chemical or electroplated finishes. The data given is based on actual experience in hundreds of plants producing war and civilian supplies. A free copy of this Digest may be obtained by writing to Oakite Products, Inc., Dept. MF, 18 Thames Street, New York 6, N. Y.

### Pennsalt Cleaner EC-10

A folder explaining the use of Pennsalt *Cleaner EC-10* in both the dip cleaning and spray washing methods of cleaning has been issued by *Pennsylvania Salt Mfg. Co.* It shows pictures of interesting tests demonstrating the stability of the product in emulsion and its quick effectiveness in dip cleaning.

A copy of the descriptive folder on Pennsalt Cleaner EC-10 will be sent without cost or obligation upon request addressed to the Special Chemicals Division, Pennsylvania Salt Mfg. Co., Dept. MF, 1000 Widener Bldg., Philadelphia 7, Pa.

### Dust Collectors

A new catalogue of individual type sections contained *Dustkop* dust collectors for collecting the dust from all sizes of surface tool, pedestal, disc grinders and sanders is now available from *Aget-Detroit Company*, Dept. MF, 602 First National Building, Ann Arbor, Michigan.

Feature of the 24-page catalogue is the indexing which is according to grinder size rather than by dust collectors, and which permits rapid selection of the correct dust collecting equipment for any type of dust source. Thus, by locating the source of dust such as tool grinder, surface grinder, sander, etc., the reader can turn immediately to the section of the catalogue that contains the dust collectors suitable for his particular size and type of grinder, sander, etc.

Dimensions of dust collector unit are carried in sketches as well as in specification tables in each section, a further aid in quickly determining the space requirements of the dust collector.

## News from California
By FRED A. HERR

A career of 52 years in the plating industry came to an end in Los Angeles in November when *John Merigold*, proprietor of a silver and gold finishing plant in downtown Los Angeles, sold out to *William Temm* of Santa Monica, Calif., and announced his retirement.

Mr. Merigold's activity in the industry was almost equally divided between the East and West Coasts of the United States—28 years on the Atlantic Coast and 24 years on the Pacific Coast.

His first job (in 1892) was in the shop of the Merigold Plating Co., which his father, *John Merigold, Sr.*, conducted in Taunton, Mass. The business was turned over to the son when the father retired several years later. Mr. Merigold subsequently sold the machinery to *James E. Blake* of Attleboro, and during the next decade or so worked as a plater or plater's helper in Attleboro, Providence and various other New England cities.

In 1906 he established the Merigold Electro-Plating Co. at Newark, N. J., which he operated successfully until 1920. Plant foreman and a stockholder was the well-known *Oliver Sizelove*. This association was dissolved in 1920: Mr. Merigold moved to California. During his 24 years' sojourn there he has operated three different plating plants of his own, and worked at different times as a plater or plater's helper for Kane Fixture & Plumbing Co., Los Angeles, Joseff's of Hollywood, and California Treasurers, specializing, in the latter two instances, in gold and silver finishes.

Since 1941 Mr. Merigold has been operating a silver and gold finishing shop in downtown Los Angeles, doing gold plating of microphone parts on war contracts. Coincident with his retirement, he sold his Los Angeles home and has moved with Mrs. Merigold to a new home in San Gabriel, Calif.

---

The *Industrial Plating Co.*, Glendale, Calif., has been absorbed under the sole ownership of *W. B. R. Pearson.*

---

*Fred J. Arata*, formerly New York City representative for the *New England Lacquer Co.* of East Providence, R. I., is now serving

In the new Globe Tumbling Barrel Catalog, partially illustrated above, you will find the final solution to your finishing problems. It contains complete information about the nine different types of Globe Barrels in their various sizes and capacities. You will find that there is a Globe Tumbling Barrel for almost every type of finishing operation—de-burring, burnishing, polishing, painting, japanning, or drying. All of them are designed to provide finer finishing at less cost. This new catalog plus Globe's Finishing Service Department are waiting to serve you. Write today!

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1. You can process thousands of pieces at one time.
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4. The purchase price of Globe barrels is low.
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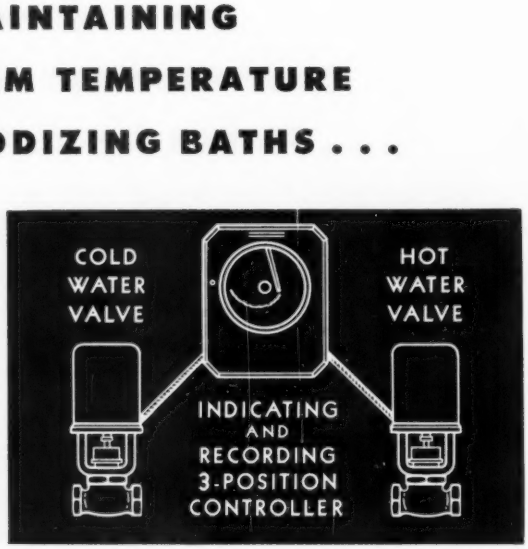


This automatic control system provides a simple, economical, and dependable means for maintaining the required temperature in anodizing baths. As the drawing shows, it uses two Barber-Colman two-position electric motor-operated valves governed by a standard 3-position indicating and recording controller. If the bath temperature is low, the valve admitting hot water to the coil opens, if the temperature gets high, the cold water valve opens, when the bath is right, both valves are closed.

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as sales engineer for the Pacific Coast branch of *Maas & Waldstein*, Los Angeles.

---

*William F. Berkenheger*, 55, consulting engineer for Ducommun Metals & Supply Co., Los Angeles, died November 2 at his home in Glendale, Calif. The survivors include the widow, *Mrs. Grace L. Berkenheger*, a son, *William C.*, and two daughters.

---

*Dr. Herbert Waterman*, associate professor of chemical engineering at the University of Southern California, who has enjoyed exceptional popularity in his appearances as a speaker on metal deposition subjects before Los Angeles Branch, A.E.S., has been named head of a special committee appointed by the Los Angeles Chamber of Commerce to conduct a survey of Southern California mineral resources.

By means of questionnaires sent to chemical manufacturers in four counties, Dr. Waterman is attempting to ascertain what chemical products are made in those areas and the proportion of California minerals used in the manufacture. Chemicals used in metal processing, metal finishing, petroleum, plastic and other industries are to be compiled in convenient reference lists by Dr. Waterman.

---

*Don* and *Gene Bedwell*, brothers and operators, respectively, of the *Bedwell Plating Co.* and *Deluxe Plating Co.*, Los Angeles, headed a party of eight members of the Southern California plating industry on an eight-day deer hunting trip to Millard County, Utah, in November. The brothers Bedwell each bagged the limit, a doe and a buck.

---

*Joseph C. Cannon* has been named California agent, with headquarters in Los Angeles, for *American Abrasive Metals Co.*, a New York corporation, with capital stock of $500,000, which recently received articles of incorporation.


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# Obituaries

## J. W. SULLIVAN

*J. W. Sullivan*, Chairman of the Board of *Skilsaw, Inc.*, died October 26 at his home in Evanston, Ill. Mr. Sullivan was 73 years old. In May, of this year, he and *Mrs. Sullivan* celebrated their Golden Wedding Anniversary.

Mr. Sullivan was the founder of Skilsaw, Inc., portable electric tool manufacturers. During the early years of the company, he devoted all of the daylight hours to calling on contractors and selling them on the value and possibilities of the first portable electric hand saw.

Mr. Sullivan became president of Skilsaw, Inc., in 1926 and was elected Chairman of the Board in 1942 when his son, *Bolton Sullivan*, was appointed president of the company.

## W. FRANKLIN DONOHOE

*W. Franklin Donohoe*, director of sales of the Finishes Division, *E. I. du Pont de Nemours & Company*, died suddenly November 10 in Chicago.

Mr. Donohoe died while on a visit to Chicago to attend a meeting of the Refrigeration Institute. He was 54 years old. A native of Philadelphia, he began his career with Harrison Brothers, a paint and chemical company purchased by the Du Pont Company in 1917. In rapid succession, he was clerk, chief clerk in sales, assistant to the secretary, assistant sales manager, assistant director of industrial sales, and sales manager for paint, varnish and heavy chemicals, serving both in the Philadelphia and Wilmington offices. More recently he was general sales manager until he was appointed director of sales of the Finishes Division October 1 this year.

Surviving are his wife, Mrs. Ida Donohoe; a son, Lieut. Howard Vane Donohoe, and a daughter, Miss Louise Helen Donohoe.

## DUDLEY H. MILLER

*Dudley H. Miller*, president and director of *Speer Carbon Company*, died November 8, 1944, at his home, 152 Center Street, following an illness of eight months.

In his early life he was a pioneer in the West and Middle West, being engaged in various enterprises, including gold mining both at Tonapah and Gold Field. In 1910 he came East where he associated himself in both a technical and administrative capacity with various industries and various projects.

At the time of his death, Mr. Miller was president and director of Speer Carbon Company; president and director of International Graphite & Electrode Corporation; president and director of International Graphite Corporation of Canada, Ltd.; president and director of the Duriron Company, Inc.; treasurer of the Guerrero Trading Company of Mexico.


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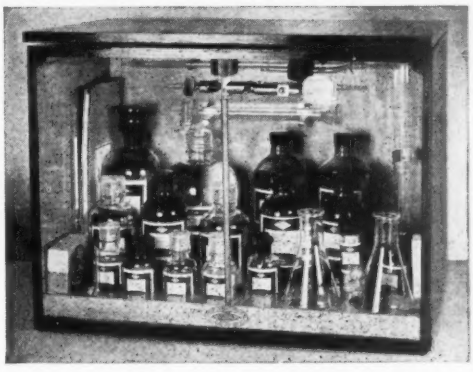

Mass production of electroplated parts for war materials has taxed the capacity of all electroplating plants. Metals are scarce and must be conserved. The large LaMotte unit, Model U7 illustrated above, provides the operator with complete facilities for efficient plating room control of acid copper, cyanide copper, acid zinc, cyanide zinc, cadmium, brass and bronze plating solutions. Price $50.00 f.o.b. Towson.
Individual units or small combination sets are also available for the following:
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# INDEX TO VOLUME 42

METAL FINISHING, January-December, 1944

## ARTICLES


### A

Acetate, Amyl ..... 655
Acetone ..... 120
Adjustable Racks Cut Loading Time..... 673
Air Compressors and Air Receivers, Cleaning..... 784
Alkyd Resin Finishes..... 718
Alumina in Anodic Baths and Other Solutions Containing Hexavalent Chromium, A Method for the Determination of ..... 72
Aluminum Cleaning, Annotated Bibliography of.... 475
Anodized Aluminum, Production of Multi-Colored Effects on ..... 82
American Electroplaters' Society to Hold 32nd Annual Conference at Cleveland, June 12-13-14..... 331
A.E.S. Conference Breaks Outstanding Record..... 398
Amyl Acetate ..... 655
Ancient Art of the Gold Beater, The..... 272
Ancient Trade Guilds ..... 674
Annotated Bibliography of Aluminum Cleaning.... 475
Anti-Fouling and Anti-Corrosive Compositions..... 60
Antiquity of Tools, The..... 208

### B

Baking Shell Cases with Infra-Red..... 516
Black Oxide Coatings on Stainless Steels..... 139
Buffing and Polishing Wheels, Suggestions for, Selection of ..... 12

### C

California, News from....36, 102, 164, 230, 292, 366, 433, 502, 569, 636, 700, 765
Carbon Dioxide Protection of Finishing Operations.. 583
Carbon Tetrachloride (Tetrachlomethane)..... 588
Centrifugal Finishing ..... 650
Chemicals, Dictionary of Metal Finishing....21, 89, 151, 211, 279, 349, 415
Chromic Acid Anodized Aluminum, Dyeing..... 141
Chromic Acid and Chromium Salts, Conservation of 617
Cleaning Air Compressors and Air Receivers ..... 784
Clippers vs. Corrosion..... 117
Coatings for Steel Cartridge Cases..... 245
Coloration of Stainless Steels, The..... 466
Color Facts ..... 713
Compositions, Anti-Fouling and Anti-Corrosive..... 60
Conditioning of Greaseless Abrasive Compounds at —20° F. ..... 10
Conservation of Chromic Acid and Chromium Salts. 617
Construction and Operation, Dip Tank.....183, 249
Continuous Straight Line Operation at Texas Division of North American Aviation..... 539
Conveying and Baking Systems for the Finishing Industry ..... 448
Corrosion, Clippers vs..... 117
Corrosion and Its Prevention in the Plating Room..74, 136
Corrosion Resistance of Sandblasted 18-8 Stainless Steel ..... 335
Counter Current on Zinc Anodes..... 545
Cyanide Brass-Plating Baths, Determination of Zinc in ..... 547

### D

Deburring Metal Parts in Bulk..... 16
Decorating Sheet Metal by Lithography..... 53
Determination of Zinc in Cyanide Brass-Plating Baths 547
Developments in Organic Finishing Equipment and Supplies During 1943..... 57
Developments of 1943, Technical..... 2
Dictionary of Metal Finishing Chemicals....21, 89, 151, 211, 279, 349, 415
Dip Tank Construction and Operation.....183, 249
Durability Characteristics of Lustreless Enamels.307, 379
Dyeing Chromic Acid Anodized Aluminum-Colored Finishes ..... 141

### E

Electrodeposited Metals, Thickness Measurements of 606
Electrodeposition, Indium and Its..... 405
Electrodeposition, Salvage by.....200, 267
Electrophoretic Finishing ..... 313
Electroplating Library—Revised and Amplified, An. 14
Electrotinning Steel Strip at Weirton Steel..... 77
Enameling and Lacquering Nameplates..... 579

### F

Facts, Color ..... 713
Films, Training Spray Operators with..... 321
Finishes, Alkyd Resin..... 718
Finishes and Finishing, Teaching..... 709
Finishes at Lockheed Testing and Evaluating ..... 780
Finishing, Centrifugal ..... 650
Finishing, Electrophoretic ..... 313
Finishing Field, What's Ahead in the..... 55
Finishing Industry, Conveying and Baking Systems for the ..... 448
Finishing Operations, Carbon Dioxide Protection of 583
Finishing Scout Cars and Tank Destroyers..... 385
Finishing Soldiers' Helmets.....443, 511

### G

Guilds, Ancient Trade..... 674
Gloss Measurement of Camouflage Materials, Methods and Standards for..... 519
Gold Beater, The Ancient Art of the..... 272
Gold Coatings, Measurement of Thickness of Fired-on ..... 342
Greaseless Abrasive Compounds at —20° F., Conditioning of ..... 10

### H

Health Hazards, in Metal Finishing Departments and Their Control, The Principle..... 602

### I

Increased Piston Ring Life by Porous Chromium Plating ..... 732
Identification of Rust on Iron and Steel..... 11
Indium and Its Electrodeposition..... 405
Industrial Health Hazards Connected with Cadmium Plating, Notes on ..... 675
Insulations and Fixtures in Precision Selective Plating, The Use of..... 338
Iron Electroplating and Electroforming, A Sulfate-Chloride Solution for .....614, 666

### K

Keeping the Army's Pipeline Together..... 590

### L

Library—Revised and Amplified, An Electroplating 14
Loading Time, Adjustable Racks Cut..... 673
Lustreless Enamels, Durability Characteristics of.307, 379

### M

Measurement of Thickness of Fired-on Gold Coatings ..... 342
Metal Cleaning and Solvent Degreasing..... 80
Metallizing Non-Conductors .....534, 610, 669, 736
Metal Parts in Bulk, Deburring..... 16
Metal Products, Plastic Finishing of..... 647
Metal Surfaces, The Nature of Foreign Deposits on. 145
Metallic Coatings, Common, Systematic Identification of the ..... 210
Method for the Determination of Alumina in Anodic Baths and Other Solutions Containing Hexavalent Chromium, A ..... 72
Methods and Standards for Gloss Measurement of Camouflage Materials ..... 519

### N

Nameplates, Enameling and Lacquering..... 579
Nature of Foreign Deposits on Metal Surfaces, The 145
New Idea in Racking, A..... 738
Nitrocellulose ..... 777
Non-Conductors, Metallizing .....534, 610, 669, 736
Notes on Industrial Health Hazards Connected with Cadmium Plating ..... 675

### O

Organic Finishing Equipment and Supplies During 1943, Developments in ..... 57
Organic Finishes and Finishing in Wartime..... 177

### P

Paint Consistency Measurements, A New Recording Viscometer for ..... 121
Patents .....23, 92, 154, 217, 281, 348, 414, 483, 548, 618, 679, 743
Pickling Liquors, Recover of Free Acid from..... 270
Pickling of Strip, Semi-Continuous..... 543
Pipeline Together, Keeping the Army's..... 590
Plastic Finishing of Metal Products..... 647
Plastics in the Plating Industry.....401, 470
Plating Industry, Plastics in the.....401, 470
Plating Room, Corrosion and Its Prevention in the .....74, 136
Porous Chromium Plating, Increased Piston Ring Life by ..... 732
Preparation and Heading of Polishing Wheels with Glue, Suggestions for..... 264
Pre-Plated Metals, Protecting..... 252
Principle Health Hazards in Metal Finishing Departments and Their Control, The..... 602
Production of Multi-Colored Effects on Anodized Aluminum ..... 82
Protecting Pre-Plated Metals ..... 252

### Q

Questionnaire, A Tumbling Finishing..... 189

### R

Racking, A New Idea in..... 738
Rapid Silver Plating ..... 408
Recording Viscometer for Paint Consistency Measurements, A New ..... 121
Recovery of Free Acid from Pickling Liquors..... 270
Rust on Iron and Steel, Identification of..... 11

### S

Salvage by Electrodeposition .....200, 267
Scout Cars and Tank Destroyers, Finishing ..... 385
Selection of Polishing Wheels, Suggestions for..... 739
Semi-Continuous Pickling of Strip..... 543
Sheet Metal, Decorating by Lithography..... 53
Shell Cases, Baking with Infra-Red..... 516
Silver Plating, Rapid ..... 408
Soldiers' Helmets, Finishing .....443, 511
Solvent Degreasing, Metal Cleaning and..... 80
Stainless Steels, Black Oxide Coatings on ..... 139
Stainless Steel, 18-8 Sandblasted, Corrosion Resistance of ..... 335
Stainless Steels, The Coloration of..... 466
Steel Strip, Electrotinning at Weirton Steel..... 77
Straight Line Operation, Continuous, at Texas Division of North American Aviation..... 539
Steel Cartridge Cases, Coatings for..... 245
Suggestions for Preparation and Heading of Polishing Wheels with Glue..... 264
Suggestions for Selection of Buffing and Polishing Wheels ..... 12
Suggestions for Selection of Buffing Wheels..... 203
Suggestions for Selection of Polishing Wheels..... 739
Sulfate-Chloride Solution for Iron Electroplating and Electroforming, A .....614, 666
Systematic Identification of the Common Metallic Coatings ..... 210

### T

Teaching Finishes and Finishing..... 709
Technical Developments of 1943..... 2
Testing and Evaluating Finishes at Lockheed .... 780
(Tetrachlomethane), Carbon Tetrachloride ..... 588
Thickness Measurements of Electrodeposited Metals 606
Tools, The Antiquity of ..... 208
Training Spray Operations with Films..... 321
Trichlorethylene ..... 319
Tumble Finishing Questionnaire, A ..... 189

### U

Use of Insulations and Fixtures in Precision Selective Finishing, The ..... 338
Use of Zinc Dust in the Purification of Zinc Plating Solutions, The ..... 344

### W

Wartime, Organic Finishes and Finishing in..... 177
Washington, This is.....18, 86, 148, 213, 276, 345, 411, 480, 550, 620, 676, 745
What's Ahead in the Finishing Field ..... 55

### Z

Zinc Anodes, Counter Current on..... 545
Zinc Dust in the Purification of Zinc Plating Solutions, The Use of ..... 344


## AUTHORS


Andrews, S. G., Testing and Evaluating Finishes at Lockheed ..... 780
Baechlin, Alfred, Jr., Corrosion and Its Prevention in the Plating Room .....74, 136
Ballard, K. H., Measurement of Thickness of Fired-on Gold Coatings ..... 342
Batcheller, Clements, The Coloration of Stainless Steel ..... 466

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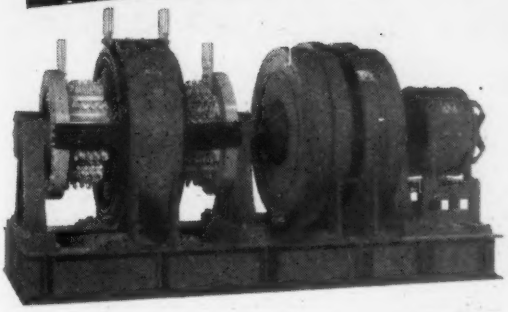

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Beck, S. E., Durability Characteristics of Lustreless Enamels ..... 307, 379
Brenneck, R. A., and Norum, R. L., Coatings for Steel Cartridge Cases ..... 245
Buente, C. F., Semi-Continuous Pickling of Strip. 543

Clark, Ralph O., Identification of Rust on Iron and Steel ..... 11
Clingan, Irvine, Black Oxide Coatings on Stainless Steels ..... 139

Darrin, Marc, and Tubbs, L. G., Dyeing Chromic Acid Anodized Aluminum—Colored Finishes.... 141
Davey, J. H., Anti-Fouling and Anti-Corrosive Compositions ..... 60
Diggin, Myron, The Use of Zinc Dust in the Purification of Zinc Plating Solutions..... 344
Dingman, Stanley T., Color Facts..... 713
Dingman, Stanley T., Decorating Sheet Metal by Lithography ..... 53

Eisenbud, Merril, The Principal Health Hazards in Metal Finishing Departments and Their Control.. 602
Engel, Edward, Metal Cleaning and Solvent Degreasing ..... 80

Fairburn, Rufus J., A Tumbling Finishing Questionnaire ..... 189
Fairhall, Lawrence T., Solderberg, K. Gustaf, Neal, Paul A., Notes on Industrial Health Hazards Connected with Cadmium Plating..... 675
Faulhaber, Frank V., Finishing Soldiers' Helmets ..... 443, 511

Geddes, J. A., and Wicker, C. R., A New Recording Viscometer for Paint Consistency Measurements.. 121
Gehm, Harry W., Recovery of Free Acid from Pickling Liquors ..... 270
Gonser, Bruce W., and Schaffert, R. M., A Sulfate-Chloride Solution for Iron Electroplating and Electroforming ..... 614, 666
Grupp, George W., This is Washington..18, 86, 148, 213, 276, 345, 411, 480, 550, 620, 676, 745
Guerke, Robert D., and Jarrett, Tracy C., Increased Piston Ring Life by Porous Chromium Plating... 732

Hall, Nathaniel, and Hogaboom, G. B., Jr., Technical Developments of 1943..... 2
Harris, Jay C., and Mears, Robert B., Annotated Bibliography of Aluminum Cleaning..... 475
Hartford, Winslow H., A Method for the Determination of Alumina in Anodic Baths and Other Solutions Containing Hexavalent Chromium..... 772
Hendren, J. T., Clippers vs. Corrosion..... 117
Henley, V. F., Production of Multi-Colored Effects on Anodized Aluminum ..... 82
Herr, Fred A., News from California...36, 102, 164, 230, 292, 366, 433, 502, 569, 636, 700. 765
Hogaboom, George B., Sr., An Electroplating Library—Revised and Amplified ..... 14
Hogaboom, G. B., Jr., and Hall, Nathaniel, Technical Developments of 1943..... 2
Hull, R. O., Counter Current on Zinc Anodes..... 545
Hunter, Richard S., Methods and Standards for Gloss Measurement of Camouflage Materials..... 519
Hyler, John E., Centrifugal Finishing..... 650

Jarrett, Tracy C., and Guerke, Robert D., Increased Piston Ring Life by Porous Chromium Plating... 732

Klinkenstein, G., What's Ahead in the Finishing Field ..... 55

Larson, I. O., and Miceli, A. S., Determination of Zinc in Cyanide Brass-Plating Baths..... 547
Leffingwell, Georgia, and Lesser, Milton, Alkyd Resin Finishes ..... 718
Lesser, Milton, and Leffingwell, Georgia, Alkyd Resin Finishes ..... 718
Liddiard, P. D., The Nature of Foreign Deposits on Metal Surfaces ..... 145
Little, Joseph Danforth, Ancient Trade Guilds..... 674
Little, Joseph Danforth, The Antiquity of Tools.... 208
Little, Joseph Danforth, The Ancient Art of the Gold Beater ..... 272
Litzler, C. A., Conveying and Baking Systems for the Finishing Industry ..... 448
Lux, Gerald A., Suggestions for Selection of Buffing and Polishing Wheels ..... 12
Lux, Gerald A., Suggestions for Selection of Buffing Wheels ..... 203
Lux, Gerald A., Suggestions for Selection of Polishing Wheels ..... 739
Lux, Gerald A., Suggestions for Preparation and Heading of Polishing Wheels with Glue..... 264

Main, Kenneth, Protecting Pre-Plated Metals..... 252
McMann, A. A., Enameling and Lacquering Nameplates ..... 579
Mears, Robert B., and Harris, Jay C., Annotated Bibliography of Aluminum Cleaning..... 475
Metcalfe, Lyne S., Training Spray Operators with Films ..... 321
Miceli, A. S., and Larson, I. O., Determination of Zinc in Cyanide Brass-Plating Baths..... 547
Mohler, J. S., and Schaefer, R. A., Rapid Silver Plating ..... 408

Narcus, Harold, Salvage by Electrodeposition. 200, 267
Narcus, Harold, Plastics in the Plating Industry 201, 470
Neal, Paul A., Fairhall, Lawrence T., Soderberg, K. Gustaf., Notes on Industrial Health Hazards Connected with Cadmium Plating..... 675
Nechamkin, Howard, and Sanders, Alvin, Systematic Identification of the Common Metallic Coatings... 210
Norum, R. L., and Brenneck, R. A., Coatings for Steel Cartridge Cases ..... 245

Payne, H. Seman, Conditioning of Greaseless Abrasive Compounds at 20° F. ..... 10

Reves, Haviland F., Plastic Finishing of Metal Products ..... 647
Robertson, Gordon, Finishing Scout Cars and Tank Destroyers ..... 385
Roehl, Edward J., Electrophoretic Finishing..... 313
Rohleder, Charles F., Organic Finishes and Finishing in Wartime ..... 177

Saltonstall, Richard B., Thickness Measurements of Electrodeposited Metals ..... 606
Sanders, Alvin, and Nechamkin, Howard, Systematic Identification of the Common Metallic Coatings... 210
Schaefer, R. A., and Mohler, J. B., Rapid Silver Plating ..... 408
Schaffert, R. M., and Gonser, Bruce W., A Sulfate-Chloride Solution for Iron Electroplating and Electroforming ..... 614, 666
Schmolze, C. D., Carbon Dioxide Protection of Finishing Operations ..... 583
Schwartz, F. W., Teaching Finishes and Finishing.. 709
Sizelove, Robert, Deburring Metal Parts in Bulk... 16
Soderberg, K. Gustaf, Neal, Paul A., Fairhall, Lawrence T., Notes on Industrial Health Hazards Connected with Cadmium Plating..... 675
Stedman, Gerald Eldridge, Continuous Straight Line Operation at Texas Division of North American Aviation ..... 539

Truden, F. A., Corrosion Resistance of Sandblasted 18-8 Stainless Steel ..... 335
Tubbs, L. G., and Darrin, Marc., Dyeing Chromic Acid Anodized Aluminum—Colored Finishes.... 141

Wein, Samuel, Metallizing Non-Conductors ....534, 610, 669, 736
Wells, C. T., The Use of Insulations and Fixtures in Precision Selective Plating ..... 338
Whitehead, Marcus A., Indium and its Electrodeposition ..... 405
Wicker, C. R., and Geddes, J. A., A New Recording Viscometer for Paint Consistency Measurements.. 121



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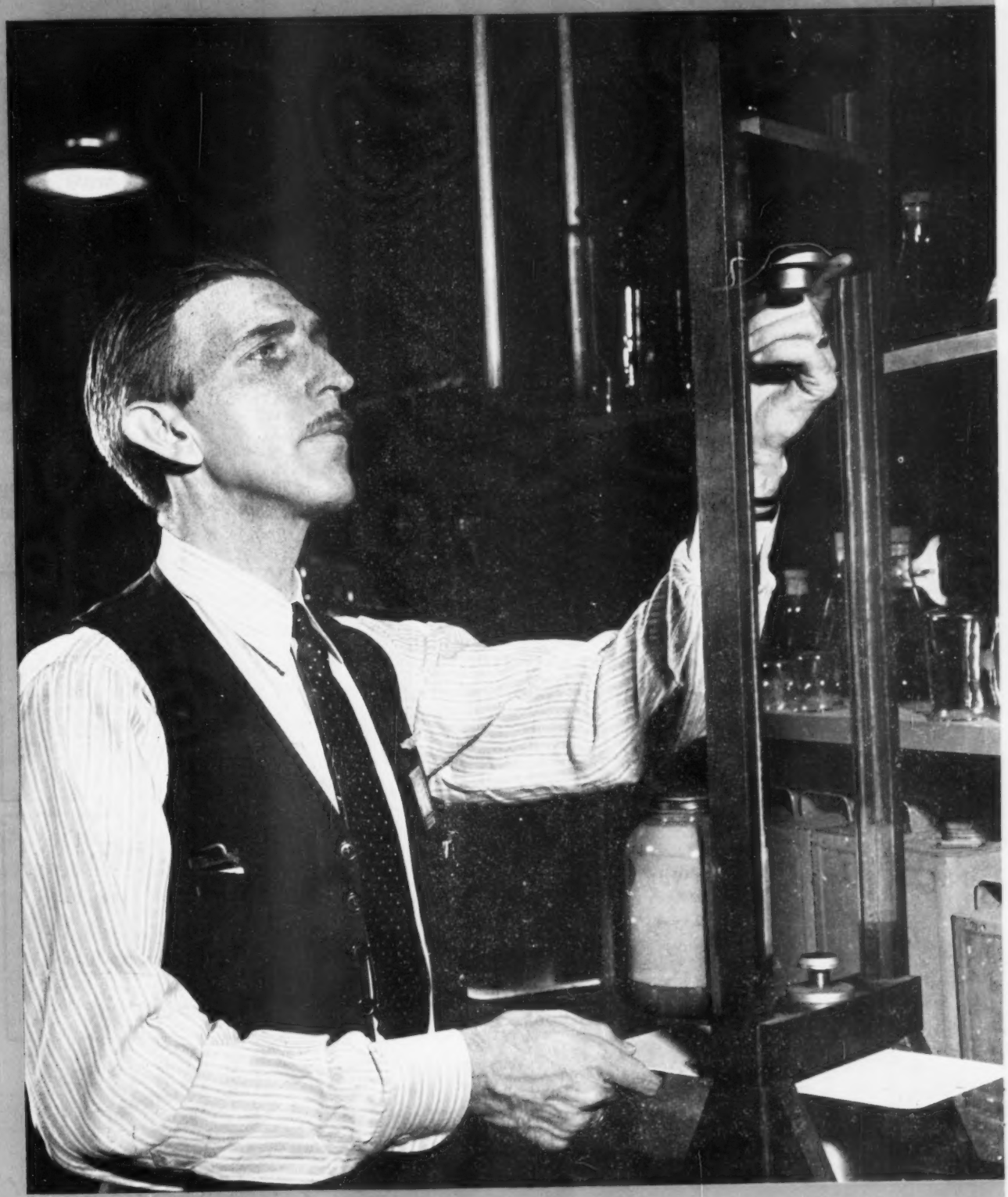

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CONTENTS

Nitrocellulose ..... 777

Testing and Evaluating Finishes at Lockheed—By S. G. Andrews ..... 780

Cleaning Air Compressors and Air Receivers ..... 784

DEPARTMENTS

News from Washington .... 775
New Equipment and Supplies ..... 786
Manufacturers' Literature .. 788
Patents ..... 789
Business Items ..... 790
Shop Problems ..... 792

**Cover Photograph**

Impact testing machine which, by distorting a finished metal panel, indicates the degree of flexibility and adhesion of the finish. *Photograph courtesy of Servel, Inc., Evansville, Indiana.*

## Cooling Is Important, Too

When an organic finish is baked, three more or less distinct stages are passed through. In the first stage solvents are eliminated from the wet film and the film (and the object to which it is applied) is heated to a given temperature. This prepares the film for the second stage in which it is exposed to the given temperature for a given period of time and during which chemical changes take place — oxidation, polymerization or condensation, depending on the resinous portion of the formulation. The third and last stage is that in which cooling takes place. Cooling is accomplished partly in the oven (some conveyor ovens are equipped with refrigerated air cooling units) and, usually, partly in the open air after the finished piece is removed from the oven.

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In many instances, especially where the new fast-baking heat converting materials are employed, it appears that the manner in which finishes are cooled after baking has an appreciable effect on the final film characteristics. For example, a typical heat converting material applied to castings and to sheet metal gave excellent results on the former, poor results on the latter. Investigation proved that the difference was due to the slower cooling of the castings because of their greater mass. When the sheet metal was cooled slowly, the material lost its poor film characteristics and equaled the finish on the castings in every way.

The effect of cooling after baking appears to be due to changes — probably physical and electrical — within the film and at the film-metal interface. The cooling of finishes may be likened to the quenching of metals during their heat treatment.

It is obvious that fast baking of organic finishes is desirable. Production demands that as little time as possible be spent on baking. On the other hand, to obtain optimum results it will probably soon be recognized that it is necessary to devote some time to cooling in some instances. We believe that many materials have been rejected not because of improper baking but, rather, because of incorrect cooling. There is more and more evidence that baking instructions will come to call not only for definite baking schedules but also for specific cooling schedules.

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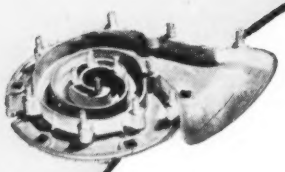

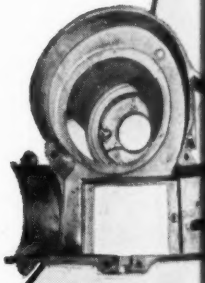

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# NEWS FROM WASHINGTON—

By George W. Grupp

METAL FINISHING's Washington Correspondent

**The Past Year In Review** As the new year will soon be here it is timely to examine some of the results of human effort in these United States during the past twelve months. Over-all industrial production has been declining since February 1944. The production of chemicals has decreased steadily since August 1943. Retail prices have increased slowly since November 1943. Wholesale prices, on the other hand, have been fairly steady. The cost of living has risen slightly but steadily since February 1944. The number of wage earners and payrolls of manufacturing industries have declined slowly but steadily since November 1943. The total sales of clear lacquers, of 158 different manufacturers, amounted 13,046,465 gallons in the year 1942 as compared with 13,757,842 gallons in the year 1943, and with 10,463,902 gallons for the first nine months of 1944. The same manufacturers sold 12,805,635 gallons of pigmented lacquers in the year 1942 as compared with 13,220,928 gallons in the year 1943, and with 10,612,253 gallons during the first nine months of 1944. During the first nine months of 1944 these manufacturers sold 16,209,927 gallons of thinners as compared with 22,030,946 gallons in the year 1943, and with 20,173,550 gallons in the year 1942. Their sales of bases and dopes for the first nine months of 1944 amounted to 2,621,464 gallons as compared with 3,506,821 gallons in the year 1943, and with 3,415,860 gallons in the year 1942. The total sales of paints, varnishes, lacquers, and fillers for 680 different establishments amounted to $529,745,027 in the year 1942 as compared with $568,620,999 in the year 1943, and with $472,598,682 for the first nine months of 1944.

**Acetone Experiments Are Being Conducted In Eire** It was learned from official sources that the EIRE Emergency Research Bureau is considering possible methods to improve the production of acetone. It is also working on processes of developing the manufacture of butyl and amyl acetates and other solvents.

**The Alcohol Situation** Direction No. 2 to Allocation Order M-30 was issued on November 11, 1944 to release immediately about 2,000,000 gallons of 190 proof ethyl alcohol for non-beverage civilian uses as a supplement to the fourth quarter allocation of industrial alcohol. The Government's reserve stockpile and working stock of alcohol amounted to 64,000,000 gallons on November 1st. The requirements for industrial alcohol for 1945 will be about 536,000,000 gallons.

**Alcohol to be Produced from Wheat in Australia** According to the Department of Commerce, the Power Alcohol Committee of the Australian Government, plans are under way for the production of power alcohol from wheat. The project calls for a plant with an annual capacity of 3,000,000 gallons. The process to be employed yields about 2.5 gallons of alcohol from each 60 pounds of wheat, as compared with the 2.3 gallons obtained by use of a more familiar malt process.

**Aromatic Solvents Control will be Continued** Class A solvents known as xylene range aromatic solvents, and Class B solvents known as toluene aromatic solvents which are governed by Order M-150, the WPB announced on October 30, 1944, will continue indefinitely under control of that order.

**Beeswax Prices Increased** Amendment number two to Revised Maximum Price Regulation No. 264, which was issued on November 6, 1944 provides that maximum buying and selling prices for crude pure beeswax produced in Portuguese West Africa may now be increased 2½ cents per pound.

**Butyl Alcohol Control Transferred to M-300** The control of butyl alcohol was transferred to Schedule 64 of Order M-300, butyl acetate has been transferred to Schedule 65 of Order M-300, and methyl ethyl ketone has been transferred to Schedule 66 of Order M-300 on November 9, 1944. On the same day butyl alcohol and butyl acetate Order M-159 and methyl ethyl ketone Order M-169 were revoked. The monthly small order exemption has been increased to 54 gallons.

**Chemical Industries of Argentina Meet Domestic Needs** Official sources reveal that Argentina's paint and varnish industry, which faced difficulties in 1943 because of shortages of nitrocellulose, plasticizers, and synthetic resins, is now using oil paints, Brazilian gums, and locally manufactured oil plasticizers. At the same sources it was also learned that Argentina's domestic production now is sufficient to meet the country's industrial needs for solvents such as butanol, butyl and amyl acetate, ethanol, and ethyl acetate. Argentina's stocks of benzol, xylol and tutuol are said to be low.

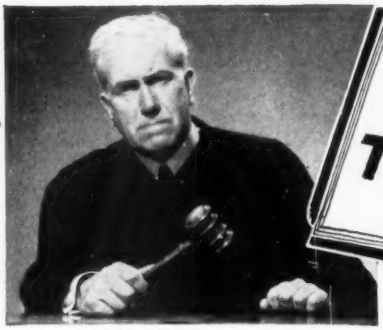
**Chromium Oxide Green Scarce in Brazil** The Department of Commerce reports that chromium oxide green has temporarily disappeared from the markets of Brazil. This commodity is used chiefly for paint and cement coloring, and in coloring ceramics and enameled ware.

**Chromium Chemicals Now under Order M-300** Chromium chemicals Order M-18-b, Phthalate Plasticizers Order M-203, and Phosphate Plasticizers Order M-183 were revoked on November 2, 1944, when these items were placed under the control of Order M-300. Chromium chemicals was transferred to Schedule 62 of the Order. The certificate of previous consumption was eliminated. Phthalate Plasticizers were transferred to Schedule 63 of the Order. The small order exemption was reduced from 200 gallons monthly to 5 gallons. Phosphate Plasticizers were transferred to Schedule 61 of the Order. The monthly small order exemption was reduced from 1,000 pounds (two drums) to five gallons.

**Ester Gums Prices Raised** The Office of Price Administration issued Amendment No. 6 to MRP 496 on November 6, 1944 to provide that the prices of ester gum may be increased 24 cents per 100 pounds.

**Linseed Oil Shortage Continues** Because of the shortage of linseed oil the WPB continues to control the use of this oil in the manufacture of paint. This reduction in the use of linseed oil has resulted in lower production costs. But the OPA has not required manufacturers to reduce their established prices unless the quality and serviceability of their products were affected by the reduced use of linseed oil.

**Phythalic Alkyd Resins Now Under M-300** The War Production Board revoked Order M-139 on October 25, 1944. Phthalic alkyd resins which were controlled by this order were transferred to Order M-300. Suppliers of phthalic alkyd resins are now required to file from WPB-2946 for permission to deliver; and users must file form WPB-2945 for permission to accept and use these resins. The list of protective coatings and resins specifications, together with permitted phthalic alkyd content, which were given in Direction 2 to Order M-139, has been incorporated in Schedule 59 of Order M-300. In transferring control a list of end uses were included in amending Order M-300.



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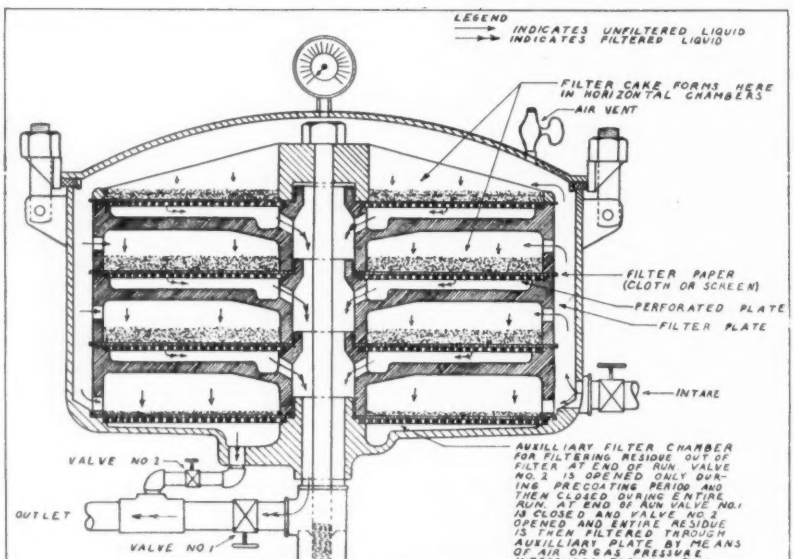
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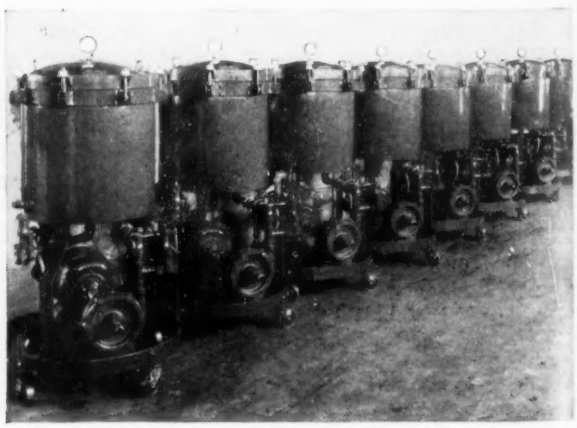

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# NITROCELLULOSE

THE big growth in the use of soluble nitrocellulose dates from shortly after the end of the first World War when the expansion of the automobile industry created a demand for quick-drying finishes to fit in with assembly-line manufacturing methods. Since then a variety of uses for quick-drying nitrocellulose has developed with attendant problems concerning their handling and application.

### *Chemistry*

Cellulose, derived mainly from cotton linters, and more recently also from wood pulp, is the chief raw material for the manufacture of nitrocellulose. Cellulose has never been prepared synthetically. Fortunately, there does not appear to be any need for apprehension concerning its availability from natural sources. The most widely accepted concept as to constitution and structure of the cellulose molecule is that it is made up of a large number of beta-glucose anhydride units joined together by ether linkages as shown in Figure 1.

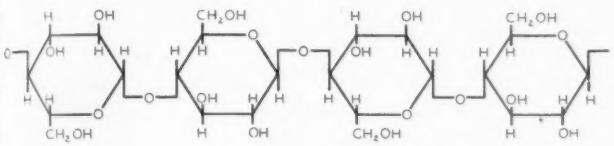

**Fig. 1.—The structural formula of cellulose is shown as a long chain molecule with three hydroxyl (—OH) groups in each glucose anhydride unit, the latter being joined together by ether (—O—) linkages.**

If one considers cellulose as a trihydric alcohol, its empirical formula can be written as $[C_6H_7O_2(OH)_3]x$. Under suitably controlled conditions cellulose can be made to combine with an acid to form an ester, as in the case of all alcohols. When the acid is nitric acid, cellulose nitrate (commonly called nitrocellulose) is the ester formed. Theoretically it should be possible to replace three hydroxyl groups with three nitrate groups in each glucose anhydride unit in the cellulose molecule, resulting in cellulose trinitrate as in the following equation:

$$C_6H_7O_2(OH)_3 + 3HNO_3 \rightarrow C_6H_7O_2(NO_3)_3 + 3H_2O$$

The nitrogen content of cellulose trinitrate is 14.14%.

Similarly, where two or only one of the three available hydroxyl groups in a glucose anhydride unit are replaced with nitrate groups, the resultant products are the dinitrate and mononitrate of nitrocellulose with nitrogen contents of 11.11% and 6.76% respectively. In actual practice not one but an indeterminate number of glucose anhydride units are present in the cellulose and upon treatment with nitrating acid some of the units may have all three hydroxyls substituted, some two, some one and others none, the distribution depending upon the conditions under which the reaction is accomplished. Thus, on analysis one obtains the average nitrogen content of an infinite number of glucose anhydride units and, therefore, it is possible to make products with nitrogen contents lying between those which would be obtained if one were dealing with single glucose anhydride units.

Production of cellulose trinitrate is unattainable in practice, the upper nitrogen limit being about 13.8%. A low limit for all practical purposes exists at about 10.5%, determined largely by the fact that products below this nitrogen content are not soluble in commercially available solvents and do not have the desirable physical properties of higher nitrogen types.

### *Manufacture*

The manufacture of nitrocellulose consists of four main steps, namely, nitration, purification, digestion and dehydration as shown in Figure 2. In the nitration of cellulose a measured quantity of a mixture of nitric and sulfuric acids and water is combined with a weighed amount of purified cellulose and is agitated at a specified temperature for a predetermined length of time. Although no noticeable change occurs in the physical form of the cellulose, nitrate groups are attached to it and water forms from the reaction. Sulfuric acid, acting as a dehydrating agent, takes up the water thus

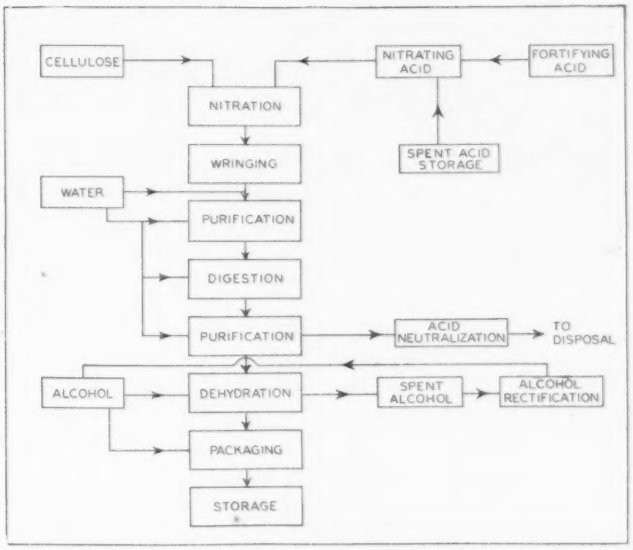


**Fig. 2.—Flow diagram illustrating steps through which nitrocellulose passes during its production.**

formed, thus permitting the reaction to proceed to the desired endpoint. After nitration the charge is centrifuged to remove as much spent acid as possible and the nitrocellulose is drowned in water.

Following nitration the water in which the nitrocellulose was drowned is drained off, fresh water is added and the nitrocellulose is purified by a series of boiling and washing treatments to remove retained acid and to decompose and remove unstable products.

Since most nitrocellulose has a high viscosity immediately after nitration and purification, digestion is practiced to reduce the viscosity to some lower point dependent on its intended use. In this treatment the nitrocellulose suspended in water is pumped through a long coil of pipe where it is heated at high pressure for varying time periods.

Upon completion of the purification treatments, the nitrocellulose is drained of the major part of its water. It is then pressed to remove still more of the water. The small amount of water remaining is removed by displacement with alcohol pumped through the nitrocellulose while held under high pressure. The compressed blocks of nitrocellulose are broken up to loosen the fibers so they will be readily soluble in the compounding of lacquers and other compositions.

### *Types*

Soluble nitrocellulose is produced commercially in any degree of nitration from about 10.7% to 12.2% and in viscosities ranging from 10 centipoises to 377,000 centipoises. The most commonly used type of nitrocellulose for lacquers is that containing 11.8 to 12.2% nitrogen. It is completely soluble in a variety of solvents chief among which are ethyl, butyl and amyl acetates. It has good tolerance for toluene as a diluent and a greater tolerance for petroleum hydrocarbons than do the lower nitrogen types. A further advantage lies in its compatibility with a large variety of resins which are soluble in practical solvent combinations useful for this type of nitrocellulose.

Nitrocellulose containing 11.2 to 11.7% nitrogen is soluble in the same active solvents but alcohol is more suitable than hydrocarbons as the diluent.

The lower viscosity types of nitrocellulose of about 11% nitrogen are almost completely soluble in ethyl alcohol alone and are completely soluble in combinations of ethyl alcohol and aromatic hydrocarbons such as toluene.

### *Solvents*

Liquids which dissolve nitrocellulose are usually referred to as true solvents. Nitrocellulose is soluble in ketones, esters and ether-alcohols. Alcohols, such as ethyl alcohol and butyl alcohol, are not true solvents for nitrocellulose but when used in combination with an ester solvent improve the solvent power of the ester and produce

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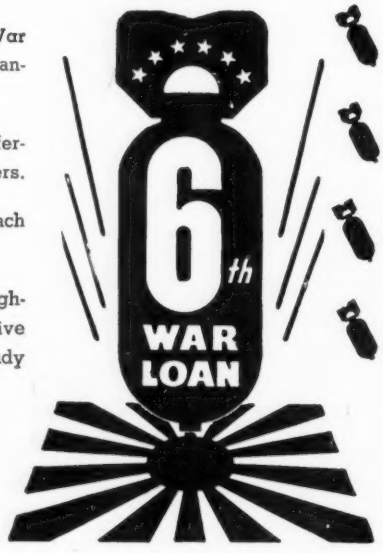


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nitrocellulose solutions with appreciably lower viscosities than when the ester is used alone. These alcohols are therefore called latent solvents or cosolvents. Hydrocarbons, either aromatic or aliphatic, are known as diluents or nonsolvents. They do not dissolve nitrocellulose. However, mixtures of true solvents and latent solvents may be diluted by the addition of the hydrocarbons with no harmful effect so long as the proportion of diluent to solvent is not so high as to prevent the nitrocellulose from being completely dissolved. Diluents are usually good resin solvents and less expensive than nitrocellulose solvents and it is customary to use a proportion of diluent in lacquers.

### *Blushing*

Nitrocellulose lacquers containing solvents and diluents which evaporate rapidly may sometimes dry to a film with a white, chalky appearance. This is known as blushing and is due to the precipitation of the nitrocellulose or other film-forming ingredients by water. Blushing is encountered most often during periods when the atmospheric humidity is high. When solvents evaporate rapidly, the air in contact with the lacquer film tends to cool. As a result, when the humidity is high the air may be cooled below the dew point temperature and moisture from the air is absorbed into the film. If this moisture is not carried out of the film by the evaporating solvents and remains behind in sufficient quantity to precipitate the film-forming ingredients, the result is a blushed coating. Excessive amounts of moisture in the compressed air used for spraying can act in the same manner as moisture absorbed from the air.

The remedy for blushing is to avoid the use of too much rapidly evaporating solvents in order to slow up the drying time. Some solvents form mixtures with water which carry the water out of the film more readily than others. Butanol is an example of a solvent with this characteristic. Also, if blushing is encountered with a lacquer, the difficulty may be overcome by thinning with a fortifying thinner, that is, one composed of slower-evaporating solvents and diluents than would be normally used. This has the effect of slowing down the drying time and producing less temperature drop in the air.

(*Material for this discussion courtesy Hercules Powder Co., Inc.*)


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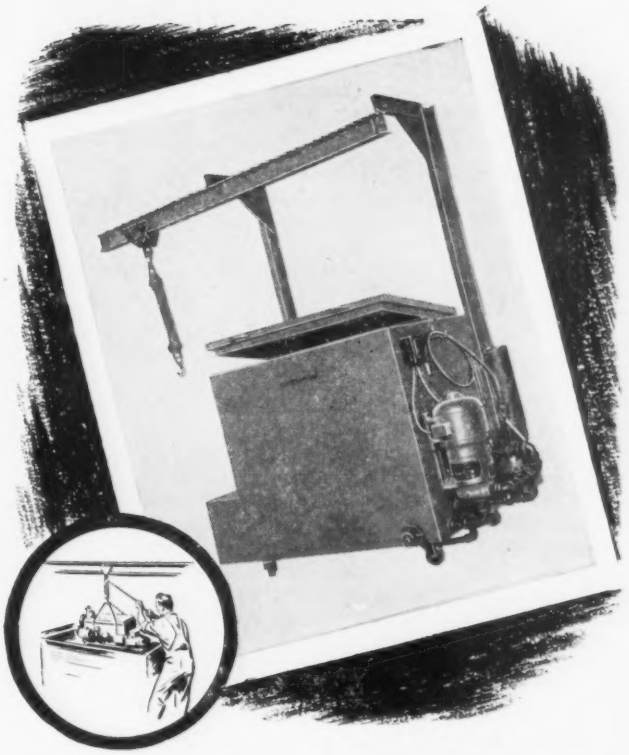

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# Testing and Evaluating Finishes at Lockheed

By S. G. ANDREWS
*Process Engineer, Lockheed Aircraft Corporation*
*Burbank, Calif.*

THE difficulties experienced by aircraft companies in applying satisfactory camouflage finishes to airplanes during the rainy season has brought about an investigation at Lockheed Aircraft Corporation in an attempt to work out procedures and materials to meet production schedules.

Due to limited hangar space at most aircraft manufacturers and because of the increase in airplane production, the time between finish application and release of ships to service is critical. The airplane must be removed from the hangar in the shortest possible time — in one to two hours after finishing. The camouflage materials are designed to dry in from one to four hours under normal conditions. However, during periods of low temperature or low humidity the drying time is prolonged. It then becomes more difficult to obtain a satisfactory camouflage finish. Since the smooth finish is obtained by sanding or polishing with compounds, the finish must be dry and throughly hard before these operations are attempted.

The requirement for smooth finishes to aerodynamically reduce airflow drag on aircraft in flight has become most important in the performance of airplanes and the smooth texture of the finish must be considered from the standpoint of application and production and materials used.

In the program of testing and study at Lockheed various materials were used. Different methods of application were tried and various conditions under which tests were made were taken into consideration.

### *Testing Procedure*

Testing of materials was carried out as follows:

1. Samples of camouflage lacquer conforming to Navy Specification M-485C and camouflage enamel conforming to Army Specification 14109B were employed.
2. Alclad panels 3x6 were prepared by production methods and coated with the various materials according to manufacturer's recommendations.
3. Panels were then dried as follows:
   a. Lacquered panels air dried for 1, 2, 3, 4 hours.
   b. Enameled panels air dried for 1, 2, 4, 8 hours.
   c. Lacquered and enameled panels force dried at 110°F. for one hour.
   d. Lacquered and enameled panels dried under infra-red lamps for 15 to 30 minutes.
4. After each drying interval panels were tested for conformance to Army and/or Navy specifications.
5. Materials were analyzed for conformance to specifications.
6. Materials satisfactory in laboratory tests were then tried in production and their performance noted.
7. Drying intervals (after which ship could be released to service) and final hardness time were noted.
8. Tests were run under normal conditions on finished airplanes and weathering resistance determined by playing a stream of water on surfaces after allowing film to dry 20 minutes.
9. Abrasion was tested by means of Taber Abraser.

The report of testing and analysis of a typical material is shown in Figure 1. Each material used in the program was tested in this manner before any production tests were attempted.

### *Finishing Troubles—Causes and Corrections*

It was found that common finishing troubles can often be overcome through simple mechanical adjustments and control of materials and conditions. Typical defects which appear from time to time are listed below with their probable causes and suggested remedies.

*Lack of flow.* When a material is insufficiently reduced lack of flow may occur. In some cases where local conditions cause fast evaporation, a slower solvent may be used. Lack of flow may also be due to excessive temperature variations. Finishing should be done at about 75°F.

*Poor drying.* Humid or cool weather is often responsible for this condition. An unclean surface may also be the cause. The surface to be finished must be free from oil, grease or other contamination. Other causes include incomplete stirring (which unbalances the formula), improper ventilation, incorrect thinner. A fast evaporating solvent may cause surface drying and entrap some of the solvent in the film and thus prolong drying.

**TEST REPORT SHEET**

*Type of Material.* Camouflage Lacquer, Insignia White.

*Specification.* M-485C.

*Specific Gravity* 9.26 lb./gal. *Non-volatile* 59%.

*Viscosity* 28 sec. Zahn 2 cup 75°F. *Reduction* 100%.

*Working Properties.* Good for spray application. Has good wet coating when reduced 100% with lacquer thinner spec. AN-TT-T-526. Will cover approximately 1000 sq. ft. Leveling good. Coverage good. Hiding power good.

*Air dry to touch.* 5 min.

*Dry to hardness.* Air dry 1 hr., infra-red 15 min.

***Resistance to water and aromatic fuel:***

*Air dry 1 hr.* Water good. Aromatic fuel poor.

*Air dry 2 hrs.* Water good. Aromatic fuel poor.

*Air dry 3 hrs.* Water good. Aromatic fuel poor.

*Air dry 4 hrs.* Water good. Aromatic fuel poor.

*Infra-red 15 min.* Water good. Aromatic fuel fair.

*Infra-red 30 min.* Water good. Aromatic fuel good.

*Flexibility.* Withstands 180° bend on ⅛ mandrel.

*Blushing.* None. *Bleeding.* None.

*Remarks.* This lacquer has good hiding power in white color and has been approved and is being specified in Finish and Process Materials Catalog.

**Fig. 1. Test and analysis report sheet.**

*Sagging film.* This is usually caused by over-thinning, use of too slow a solvent or by application of too much material. Application in strong sunlight will cause top drying and slippage of film on vertical surfaces.

*Lack of hiding.* This occurs when the surface is cold and smooth, increasing the tendency of the film to flow off. This requires a faster evaporating solvent or indicates insufficient stirring and mixing.

*Lack of adhesion.* In some cases this is caused by the use of excess amounts of drier which will reduce the toughness of the film. In other cases topcoats may not adhere to primers and may actually lift base coats because of solvent action. Improper cleaning or chemical treatment will also cause poor adhesion.

*Crazing of film.* This may be caused by heavy coats or by sudden chilling of the film. Finishing room temperature should be constant and drafts eliminated.

*Blushing.* Blushing of lacquers may be caused by a number of factors including high humidity, drafts, poor thinner, cold lacquer, moisture in air lines.

*Pinholes.* These may be caused by drying conditions which cause the solvent to break through the film surface, moisture in air lines or too rapid evaporation of thinner. The surface should be completely dry before applying finshes.

### *Mechanical Difficulties and Causes*

The successful application of sprayed coatings depends on hand-

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**DEOXIDINE 210** not only cleans efficiently, but at the same time properly conditions the metal surface to meet the exacting requirements of Army Specifications AXS-1245 (Grade 1) Finish (when used as directed in ACP Technical Service Data Sheet No. 3-2-210-2.)

The ability of this phosphatic material to properly condition the surface of the many ordnance parts, at the same time it removes cutting oils, simplifies the equipment required. A three stage power washer is all that is needed to simultaneously *complete* both *cleaning* and *conditioning* operations. The equipment may be constructed of mild steel throughout—stainless steel is not required.

Large volume production of large or small work can be handled continuously and rapidly by the effective **DEOXIDINE 210** process. The simplicity and efficiency of this process adapts it, not only to the cleaning and conditioning of present war materials, but also to the cleaning of postwar metals as well.

The detergent properties of **DEOXIDINE 210** are superior to alkali cleaners in most instances and the surface produced greatly improves paint adhesion and durability.

There are other types of DEOXIDINE suited to varying requirements in metal cleaning and for application with brushes or in immersion tanks as well as spraying in power washers.

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ling technique and proper adjustment and maintenance of spraying equipment. Various spraying troubles and their causes are given below.

1. Fluid leakage from needle packing nut.
   a. Loose nut.
2. Fluid leakage from front of gun.
   a. Dry packing.
   b. Needle not seating.
   c. Worn tip.
   d. Dirt on tip.
   e. Broken needle spring.
   f. Packing nut too tight.
3. Air leakage.
   a. Air valve not seating.
   b. Dirt on valve or seat.
   c. Worn valve or seat.
   d. Broken spring.
   e. Sticking valve stem.
   f. Tight packing nut.
4. Jerky or fluttering spray.
   a. Air leakage into fluid line.
   b. Insufficient material in container.
   c. Container tipped at acute angle.

### *Surface Finish Conditions and Causes*

1. Heavy top pattern.
   a. Horn holes partially plugged.
   b. Obstruction on top of fluid tip.
   c. Dirt or dry paint on air cap seat or fluid cap seat.
2. Heavy bottom pattern.
   a. Horn holes partially plugged.
   b. Obstruction on bottom side of fluid tip.
   c. Dirt or dry paint on air cap seat or fluid cap seat.
3. Heavy right side pattern.
   a. Right side of horn holes partially plugged.
   b. Dirt on right side of fluid tip.
   c. Right jet clogged (twin jet cap).
4. Heavy left side pattern.
   a. Left side of horn holes plugged.
   b. Dirt or dry paint on left side of fluid tip.
   c. Left jet clogged (twin jet cap).
5. Heavy center pattern.
   a. Low setting of spreader adjustment valve.
   b. Low atomizing pressure or high material viscosity (twin jet cap).
   c. Too high fluid pressure for cap's capacity (pressure feed).
   d. Too large nozzle for material used.
6. Split spray pattern. Air and fluid improperly balanced. Reduce width of spray pattern or increase fluid pressure. Increasing fluid pressure requires increased speed of handling.
7. Orange peel finish. A common cause is improper thinner. A slow evaporating thinner usually eliminates this fault.
8. Streaks in finish.
   a. Tipping gun. One side of pattern hits surface from shorter distance causing more material to be applied at this point.
   b. Air cap or fluid tip may be dirty or burred causing heavy top or bottom pattern.
   c. Split spray causing heaviness at top and bottom of pattern. Reduce width of spray or increase fluid pressure.
9. Runs and sags.
   a. Too much material. Reduce fluid pressure or increase operating speed.
   b. Gun tilted at angle. More material is supplied where pattern is closest to surface.
   c. Over reduction of material or too slow evaporating thinner.
10. Mist or fog.
    a. Over atomization due to:
       (1) Too high atomizing air pressure.
       (2) Wrong air cap for material being sprayed.
       (3) Wrong fluid tip for material being sprayed.
       (4) Fluid pressure too low (pressure feed).
    b. Improper use of gun due to:
       (1) Incorrect stroking.
       (2) Gun too far from surface.
11. Other finishing troubles due to:
    a. Insufficient atomization.
    b. Material not thoroughly dissolved or agitated.
    c. Drafts in finishing room.
    d. High humidity.

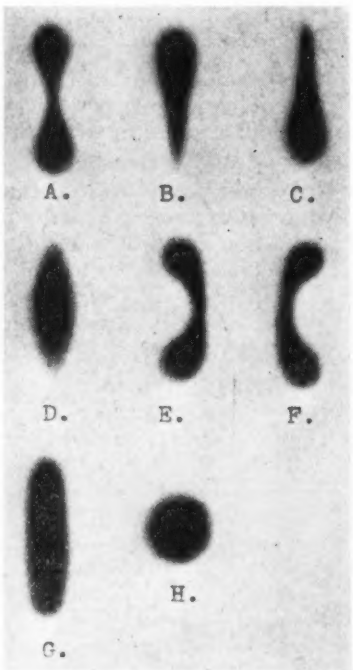


Fig. 2. Spray gun patterns. A. Split spray. B. Heavy top pattern. C. Heavy bottom pattern. D. Unbalanced pattern. E. Heavy right side pattern. F. Heavy left side pattern. G. Ideal fan pattern. H. Ideal round pattern.

### *Test Results*

Results of tests indicated that there was little difference in the performance of enamels and lacquers. However, with a film equivalent to 1 mil, the drying time is much faster. One mil thickness is obtained by applying one coat at a spraying viscosity of 24 sec., Zahn No. 2 cup. The initial set-up of various materials manufactured to specifications are practically the same due to the strict ingredient requirements of the specifications. Some films remain soft longer than others for initial drying to handle but most specification materials will dry hard in 24 hours.

Force drying at 100° and 120°F. showed some advantage over air drying. The resistance to aromatic fuel and water, however, is no better. Drying time to hardness is decreased approximately 25% by means of hot air.

Under normal conditions decalcomanias can be applied to ships in one hour after lacquering and in two hours after application of enamels.

Drying with infra-red lamps can be accomplished in 15 to 20 minutes for cellulose nitrate materials. However, care must be exercised not to overheat the film since blistering may occur.

Smoothness of film is attributed to fineness of grind of material and the care used in its application.

Flow, drying time and gloss are dependent to a great extent on the choice of solvent. Knowledge of reducers and their use is helpful in adjusting application procedures to overcome defects caused by local or atmospheric conditions.

CUT DOWN REJECTS WITH

ORVUS

IN YOUR METAL CLEANING BATHS

This sulfated fatty alcohol Cleansing Agent is EFFECTIVE

—as a surface tension lowering agent

—as an emulsifier

—in dispersing lime soaps which might cause poor plating results if permitted to deposit on the metal

*Write for further information about Orvus to*

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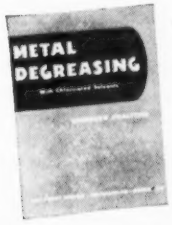
# WHEN

## IS THE TIME FOR

# VAPOR DEGREASING*?

**TODAY** is the time for vapor degreasing. *Tomorrow*, too. Because, in utilizing the chemical and physical properties of Trichlorethylene or Perchlorethylene and specially designed equipment for rapid, efficient removal of metal parts, solvent degreasing saves time, saves cost—is an *all-time* tool of industry.

Yes, vapor degreasing has become a *basic part* of production flow lines. It has served to boost war production. And it will serve in peacetime, too, for commercial production of better products faster. It is an important step in good cleaning practice.




**"METAL DEGREASING—STANDARD PRACTICES"**

*This new booklet, prepared by Du Pont in consultation with equipment manufacturers, outlines the fundamentals of safe and efficient operation of vapor degreasing machines. Copies on request.*

**BE INFLATION WISE! Don't pay more than ceiling prices! Don't buy on the black market! KEEP PRICES DOWN!**

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BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

### THIS METHOD...

1. **Thoroughly removes grease** and oil from metal parts of any size or shape, usually in a minute or so.
2. **Produces parts clean,** warm and dry—ready for inspection, assembly, further fabrication or finishing of any type.
3. **Minimizes finishing rejects** because solvent reaches and removes grease and oil from deep draws, holes and places which are almost inaccessible.
4. **Reduces risk** of damage to delicate parts.
5. **Can be used alone** or as a part of a process flow line.
6. **Utilizes** compact equipment that fits into small space.
7. **Consumes** only small quantities of solvent. Contaminated solvent is recovered economically for re-use.
8. **Uses** the absolutely pure vapors of a non-flammable solvent as a cleaning medium.
9. **Simplifies** cleaning procedure, is easy to operate as a process.
10. **Saves time and cost**—in its own operation, and in the subsequent handling and finishing of parts.

**E. I. DU PONT DE NEMOURS & CO. (INC.)**
**Electrochemicals Department**
**Wilmington 98, Delaware**

***Vapor degreasing is basic for good metal cleaning. For each job there is a suitable cycle or combination of treatments. In every case, the final rinse in pure, uncontaminated solvent vapor assures positive removal of the last traces of grease and oil.**

# Cleaning Air Compressors and Air Receivers

### *Problem*

WHAT is the safe procedure in cleaning air compressors and air receivers?

### *Hazards*

Cleaning air compressors and air receivers may result in:

a. Injury to workers through entering air receivers that are deficient in oxygen or which contain sludge that may give off noxious gases.

b. Injury through handling the cleaning compounds used.

c. An explosion when the compressor is operated, due to the use of a highly flammable cleaning compound.

d. Miscellaneous injuries to the maintenance crew through improper handling of tools or poor job planning.

### *Discussion*

It is important that compressors, receivers and compressed air piping be kept clean. It is, however, easier and safer to prevent the accumulation of oil and carbonaceous materials than it is to clean out such accumulations after they have formed. The consistent use of efficient air filters on the compressor intake, a proper amount of the best oil obtainable and regular inspection of valves will do much to eliminate the necessity for special cleaning.

Keeping the air compressor and its receiver and piping system clean is important from the standpoint of both efficient operation and the prevention of explosions. According to some authorities, explosions may arise from improper lubrication, intake of contaminated air, excessive air cylinder temperature or poor interstage or after-cooling of the air.

To prevent explosions and decrease the frequency of inspections and cleaning jobs in air compressor installations, only the oil recommended by the compressor manufacturer or other oil which has efficient lubricating qualities as well as a high flash point should be used. It has been suggested that lubricating oils be used in which not more than two per cent of light fractions are present, as determined by tests on a compression cracking cylinder simulating actual operating conditions. No more oil than an amount sufficient to properly lubricate valves and pistons should be used since excess oil carried over into the receiver means that the air in the receiver will be contaminated. Cheap oil or oil unsuited for compressors may quickly carbonize in the piping and fittings of the compressor and on the cylinder walls and valves. This causes overheating and increases the danger of an explosion.

In general, little trouble is experienced with temperature control of air on well designed and properly installed and operated air compressors. Where hard water is used for cooling, or where the water is contaminated by silt, animal life or even sewage, the cooling system gradually becomes less efficient, until interstage and after-cooler temperatures approach the danger point. Where this is the case, a regular and thorough cleaning operation is indicated at a frequency dependent upon the severity of the condition.

Recognized good practice in operating air compressors calls for a system of periodic inspection and overhauling suited to the conditions of operation. Under such a program, all equipment is inspected and cleaned at regular intervals, regardless of the apparent operating condition. In the case of an air compressor, the schedule is set so that the valves are inspected and cleaned from once a month to once in three months and a complete inspection and cleaning of the compressor, line, receiver and auxiliaries is made semi-annually or annually. The frequency of cooling system inspection and cleaning will be determined by water conditions. Cards with colored tabs indicating the dates of these various operations, and also forming a record of performance of the work, are used. Inspection periods for valves, cylinders and receivers, too, will vary according to the use of the compressor and other conditions affecting it. In general, the periods given represent an average for this type of work.

In one company operating a large number of air compressors under unusually severe conditions, the following schedule of inspection has been set. Valves are inspected and cleaned once a week. Cooling systems are cleaned once a month. Air receivers and lines are cleaned every three months and given a hydrostatic test once a year. Safety valves are tried and air receivers blown once each eight-hour shift. A running log of operating conditions is kept showing pressures and temperatures. Any variation from the normal, of course, calls for immediate investigation and, if necessary, shut-down and repair. So high an inspection frequency will not be necessary in plants where operating conditions are less severe.

### *Cleaning Air Compressors*

It has been recommended that soapy water or any suitable non-toxic, non-flammable solution be used for cleaning air compressors. Experienced operators and engineers are divided in their opinions on the use of soapy water. Those who favor its use point to the excellent cleaning job it does in air compressors, while the opponents state that damage may result because of rust or the possibility of accident that exists if the soapy water is not entirely removed from the compressor after use. Compressor manufacturers generally do not favor the use of soapy water and they suggest that the use of proper oils, air filters and strainers will eliminate any necessity for such cleaning. Soapy water, if used, can be made of one part soft soap and 15 parts of water, although some companies who use it insist on a soap with a pH as near 7 as possible. These suds should be used in place of the oil for a few hours, either with a hand pump or through the regular lubricator, at a rate about 10 times as rapid as the oil is fed. After using the soap suds, the drain cocks of the air receiver and inner cooler are opened and the accumulated liquid is drawn off. Oil is then replaced and the machine is operated for about one-half hour before shutting down, to prevent rusting. *Kerosene, gasoline or other light oils should never be used for cleaning because of the danger of explosion.*

In cleaning water jackets, the solution depends upon the cooling water contaminant. Where only silt is encountered, it is possible to blow air and water through the water jacket at the same time, depending upon the turbulence created to remove any deposits. In other cases, merely flushing the jacket with a water hose will remove the silt. Hard water which causes scale deposits, however, calls for the use of some agent that will remove them, such as one to five solutions of muriatic acid in water, or a 1 to 20 solution of a 4 to 1 mixture of trisodium phosphate and soda ash. Or better still, scale deposits may be prevented by treatment of the water before use so the scale-forming matter is precipitated in settling tanks.

### *Cleaning Air Receivers*

When air receivers are to be cleaned, the following procedure based on the combined safe practices of National Safety Council members, should be used:

Only thoroughly qualified men should be assigned to this work. They should be instructed to wear approved-type goggles and safety shoes, as well as other protective equipment which may be needed while engaged in the operation.

The compressor should be shut down and all starting and control equipment should be pulled and locked in an inoperative position. Switches and valves should be tagged with warning signs reading "DANGER! MEN WORKING ON EQUIPMENT. DO NOT START," or other suitable wording. Only the person who locks and tags the control devices should have the key to the lock or be permitted to remove the tag. It is good practice to blank off steam lines to make absolutely certain that steam cannot accidentally be turned into the compressor prime mover.

The air pressure should next be released by blowing the receiver.

The manhole cover should be removed, and if more than one cover is provided, all should be removed to improve ventilation. If the manhole covers are of the externally bolted type, they should be pried loose

from their seats before removing all of the bolts or nuts. This will prevent the cover from being blown off by any residual pressure in the tank.

The tank should be tested for oxygen deficiency, the presence of volatile gases or carbon monoxide before men are permitted to enter. These tests can be quickly made by means of commercially available testing equipment. If combustible gases or carbon monoxide are present, a supplied air respirator or approved-type hose mask should be used by men entering the tank. Where there is an oxygen deficiency, ventilation can usually be supplied by means of a blower. Most companies make a practice of using a blower even though the air in the tank is found to be pure, because of the resultant improvement in working conditions. The man entering the tank must be equipped with a life line, the free end of which is in charge of a second man outside the tank. The second man should be given specific instructions as to his duty in an emergency and it should be impressed on him that he is not to enter the tank until he has first obtained other help and donned the necessary protective equipment.

Every effort should be made to insure positive ventilation of air receivers before men are permitted to enter them, rather than to depend on protective equipment.

There are several methods for cleaning the inside of an air receiver. These include washing the walls with soap and water, scraping with non-ferrous scrapers, wiping down with waste or cloth or brushing. In some plants soda ash is spread in the tank and allowed to remain from one to four hours. Soda ash and loose scale are later flushed out through the drain opening or blow-off. When rags are used, care must be taken not to leave lint in the receiver. Lint may ignite when the receiver is put under pressure and cause an explosion.

After the man has come out of the tank, the gang foreman should inspect the interior to make certain no scale, wiping rags or tools that might obstruct the blow-off have been left in the tank.

The manhole covers should be replaced, using new gaskets, and the blow-off closed. If a hydraulic test is to be made, it should be done at this time by a qualified person, either a boiler inspector or a specially trained employee. The compressor can then be made ready for operation by removing the danger tags from the switchboard or steam control valve. The blanks in the steam line, of course, should be removed.

When the pressure in the air receiver reaches the normal operating level, the safety valve should be tried. The blow-off should then be opened momentarily to force out any scale that may be lodged against the valve seat.

Care must be taken when using kerosene for cleaning valve parts that every trace of it is removed before the valve is reassembled. This can be accomplished by wiping thoroughly with clean rags, care being taken to remove any lint that may adhere.

All guards should be in place before the compressor is started.


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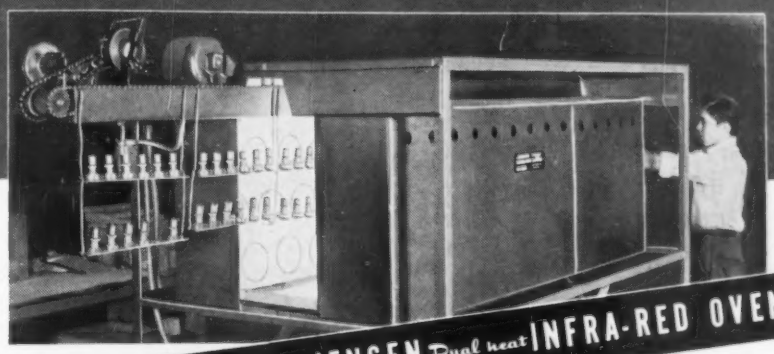

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Any portable electric lamps or tools used on this work, especially those used inside the tank, should be of the explosive-proof type and should be grounded. A built-in third conductor which can be connected to the regular plant grounding system is one method by which grounding can be assured for this equipment. Specially designed low voltage lamps and portable electric tools are available and are in use by many companies. The voltages generally used are 6, 12, 24, or 32. The low voltage is secured by means of a special transformer which is plugged into the regular outlet. It is so designed that it is not possible to plug in the secondary in place of the primary on the 110- or 220-volt source of supply.

Only heavily insulated extension cords should be used on portable tools and extension lamps. Keyless-type insulated lamp sockets should be provided on extension lamps and they should be equipped with an insulated metal guard or one made of non-conducting material.

Goggles, gloves and safety shoes should be worn on this job to prevent eye, hand or toe injuries.

The area around the job should be kept free from debris, materials, water or grease to prevent falls of workers.

Since inspection and repair work of plant equipment is usually done on week-ends or holidays, it is suggested that at least one extra man be provided in the crew in case of emergency. At least one telephone near the scene of the operations should be left in service so that it will be possible to get outside help quickly if it is needed.

*(From Industrial Data Sheet D-Me. 14, courtesy National Safety Council, Chicago, Ill.)*

# NEW EQUIPMENT AND SUPPLIES

## "Speed-Alaka" Finish

Lacquer & Chemical Corporation, Dept. OF, Brooklyn, N. Y. have developed a new type of finish for Grumann Aircraft Engineering Corp. that increases speed yet conforms to government specifications.

Grumann, seeking a finish with a new smoothness for greater speed and yet complying with the requirements of Specification M-485-C and superseding Specification AN-L-21, put their problem in the hands of Lacquer & Chemical Corporation's research department. Alaka chemists got busy and produced "Speed-Alaka" upon which patents are now pending. This new finish air-dries in less than 5 minutes and increases both the speed of Grumann's production and the air speed of the Grumann Hellcats. The material requires no buffing and may be made glossy to meet Specification AN-TT-L-51.

## "Hammertone" Finishes

The manufacture of "Hammertone" finishes, interrupted by the war, has been resumed by Maas & Waldstein Company, Dept. OF, makers of industrial finishes, Newark, N. J. These finishes simulate hammered silver, copper, bronze and other ornamental metals and are for application on most metals or bakelite type (phenol formaldehyde) molded plastics.

Recent refinements in manufacture have improved the working qualities of the finishes and simplified their application, according to the manufacturer. A base coat of the color desired is sprayed on and then quickly followed by a spatter coat of Hammertone liquid to produce the hammered pattern in the base coat. When a conveyor oven is to be used, parts may be placed on the conveyor chain immediately after spraying and baked at medium heat. When the regular convection oven is used, the product is allowed to set for 15 to 20 minutes before baking. Either method, it is claimed, produces a lustrous metallic finish that is very tough and durable.

With a special spatter gun perfected by Maas & Waldstein, the size of the pattern is regulated by the air pressure of the gun so that even an inexperienced operator can spray any desired pattern and maintain it.

The adaptability of Hammertone to continuous production methods makes it a practical finish for post-war metal novelties, heating units, air conditioning equipment, metal cabinets and furniture, molded radio cases and many other products, according to the manufacturer.

## Metal Coatings

Cordo Chemical Company, Dept. OF, Norwalk, Conn., has announced Cordo 1070 primer and the Cordo 1075 finish coat series. These materials, made from inert synthetic resins, possess high adhesion and plasticity even over polished metal and thus allow processing and forming without cracking or flaking. They are also highly resistant to abrasion and shock and are impervious to cold dilute mineral acids, alkalis, sea water, oxidizing agents, gasoline, oils, etc.

1070 is available in gray only. 1075 is available in 12 standard colors or special colors can be supplied. Both materials may be sprayed, dipped or roller coated and cover about 300 sq. ft. per gallon. 1070 is air-dried for one-half hour. 1075 may be air-dried or baked at schedules ranging from 30 minutes at 250°F. to two hours at 150°F.

## Fungus Resisting Impregnating Varnish

A fungus resisting impregnating insulating varnish, Synthite PG-4-FC, for all types


TECTYL *helped to salvage the Squalus*

The hull and engines of the submarine Squalus, long immersed in sea water, were flushed with Tectyl 511, which pushes every trace of water off of metal and SEALS the surface against rust and corrosion. One of the five specialized types of Tectyl will solve your own special rust-prevention problem. Easy to apply and remove, economical to use—Tectyl protection is *positive*. Write now, indicating your corrosion problem, and we will send you Tectyl bulletin with complete application data.

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111MF GOUNDRY STREET NORTH TONAWANDA, N. Y.
**The Taber Test *Proves* What Wears Best!**

of electrical windings which meets United States Army Signal Corps requirements has been developed by the John C. Dolph Company, Dept. 45, Newark, N. J.

Unlike the conventional surface protective coating, PG-4-FC varnish protects each layer of wire. Therefore, if the surface of the winding is damaged in rough handling, the fungicidal protection of the varnish is still retained.

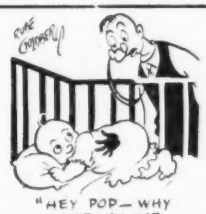
Curing takes place through heat induced chemical polymerization which brings about complete solidification of the entire mass. This type of curing eliminates the possibility of wet spots in the interiors of windings.

The degree of hardness can be controlled by altering the baking time and temperature. Although this varnish solidifies completely in a relatively short period of time, a longer bake will produce a finish which is extremely hard.

Synthite PG-4-FC clear baking varnish is adaptable for use on the modern types of polyvinyl acetal coatings of magnet wire. Also, because of its excellent heat dissipating properties, it is used on glass insulation which is recommended for units having high temperature rises. This insulating varnish is ideally suited for use on other types of Class "B" insulation as well as textile tapes. It affords maximum resistance to acids and alkalies and can be applied on all types of electrical units, large or small.

### New Silicone Insulating Resins

"Silicones," a new class of organic-silicon insulating materials are now in commercial production by Dow Corning Corporation, Dept. OF, Midland, Michigan, it was announced recently. These new products have exceptional heat stability, resistance to moisture and freedom from carbonization at high operating temperatures. They are, therefore, natural complements to inorganic spacing insulation such as Fiberglas, asbestos and mica.


**If you have too much lost time due to skin infections and dermatoses, look into the kind of hand cleaner your workers use. Maybe they are buying harmful, harsh cleaners because they are fast working, and cheap.**

**Magnus Hand Cleaner is fast enough, and requires no scrubbing or brushing. But it is safe for the tenderest skins, free from harmful, harsh chemicals and gritty abrasives. It belongs in every plant washroom.**

***Ask for a liberal trial sample and look into this question of insuring safety in hand cleaning by supplying the hand cleaner as a company service.***

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INDUSTRIAL CLEANERS

*For Better and Faster Cleaning!*

**"PENOTRITE"**

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- ✓ Right at the Bench
- ✓ Along the Production Line
- ✓ Prior to Painting
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*The* **ABBOTT** *Method*

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Many types of industries are using the ABBOTT Method of Barrel Finishing. Odd shapes and sizes of parts are efficiently and speedily handled by the Abbott Method . . . Try it!

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the facts are yours—free.

**THE ABBOTT BALL COMPANY** 1046 NEW BRITAIN AVE. HARTFORD 10, CONN.

● Old Man Corrosion is always a threat, and never more so than during these winter months. So now is a good time to give every surface protection against the forces of wear and decay.

While restrictions on the sale of aluminum paints have been relaxed, certain materials required in producing Permite Aluminum Paints for product finishing are still scarce. So product finishing aluminum can be supplied only on orders of high priority rating.

The experience of Permite chemists and the facilities of Permite's modernly equipped paint plant are also at your service in providing synthetic enamels, varnishes, lacquer enamels – and other product finishes formulated to government specifications.

Quotations on your requirements submitted promptly upon request.

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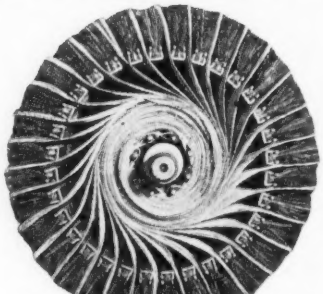
For **deburring** edges and corners. For **smoothing** rough surfaces. To **prepare** metal parts for other finishing operations.

The Vonnegut Brush-Backed Abrasive Head is particularly desirable for smoothing irregularly shaped edges and curved surfaces of materials offering too much resistance for efficient results with wire wheel brushes and of such contour that they cannot be worked to advantage with solid grinding wheels.

There is a big field for this new type of head and it may be the solution for one or several of your difficult clean-up problems. For further information write to,



View of Vonnegut Brush-Backed Abrasive Head with end cap removed, showing coiled magazine loading of 32 strands of abrasive cloth with ends extending along side 32 radially projecting brushes.

**VONNEGUT MOULDER CORP.**

**1852 MADISON AVE. INDIANAPOLIS 2, INDIANA**


# Manufacturers' Literature

### Infra-Red Booklet

The manufacturers of Birdseye infra-red radiant heat lamps, *Wabash Appliance Corporation*, Dept. OF, 345 Carroll St., Brooklyn, 31, N. Y., have prepared a special illustrated booklet on the uses and limitations of the near infra-red process.

### Metal Coatings Booklet

An eight-page booklet describing Cordo 1070 primer and the Cordo 1075 finish coat series has been issued by *Cordo Chemical Company*, Dept. OF, Norwalk, Conn. The booklet is very complete and includes descriptions of the Cordo materials, recommended uses, application instructions, chemical tests and a price schedule. Finishing engineers in the marine, chemical and processing, gasoline and oil, food and dairy and aircraft industries will find the booklet useful and interesting.

### Air Conditioning

How to plan post-war air conditioning to control temperature and humidity, clean the air and provide adequate ventilation and air circulation is discussed in a new 16-page illustrated booklet announced by *Westinghouse Electric Elevator Company*.

The booklet tells how air conditioning works, outlines the principal factors which must be considered to plan air conditioning for a specific application and pictures and describes equipment including compressors, condensers, units and coils.

Installation photos illustrate the three general types of air conditioning — self-contained, factory-built within-the-space units, self-contained factory-built central-plant units and custom-built central-plant units.

Copies of the new booklet *How to Plan Your Post-war Air Conditioning Today* may be secured from the Westinghouse Elevator Company, Dept. OF, 150 Pacific Ave., Jersey City 4, N. J.

### Infra-Red

A new booklet, *Economical Utilization of Infra-Red Radiant Energy*, has been issued by the *Fostoria Pressed Steel Corporation*, Dept. OF, Fostoria, Ohio. This 8-page booklet discusses applications of infra-red radiation such as baking, drying, preheating and dehydrating. It also describes the company's infra-red equipment and lists the advantages and specific uses for infra-red.

### Heresite

*Heresite & Chemical Company*, Dept. OF, Manitowac, Wis., has issued a 32-page illustrated booklet describing its Heresite plastic coatings, synthetic resins and synthetic rubber. Of most interest to finishing engineers is the section of the booklet devoted to industrial coatings, baked coatings and air dry coatings. The resistance of these materials to acids, alkalis, solvents and other deteriorating influences is described in detail. Numerous tests showing the superiority of the protection of these coatings are illustrated and discussed. Photographs of various applications where corrosion resistance is a factor are also given.

# Patents

### Spraying Flagpoles

*U. S. Pat. 2,357,144.* C. B. Stair, Aug. 29, 1944. A device for treating the external surface of a flagpole including guide means adapted for engagement with and movement longitudinally of the external surface of a vertically disposed flagpole, spraying mechanism associated with said guide means and operable during the vertical movement thereof for contemporaneously spraying a continuous circumferential area of said exterior surface of the flagpole, and halyard coupling means movable as a unit with said guide means and said surface spraying mechanism whereby vertical movement may be imparted to said surface spraying mechanism as an incident to the shifting of the halyard of an associated flagpole.

### Spray Nozzle

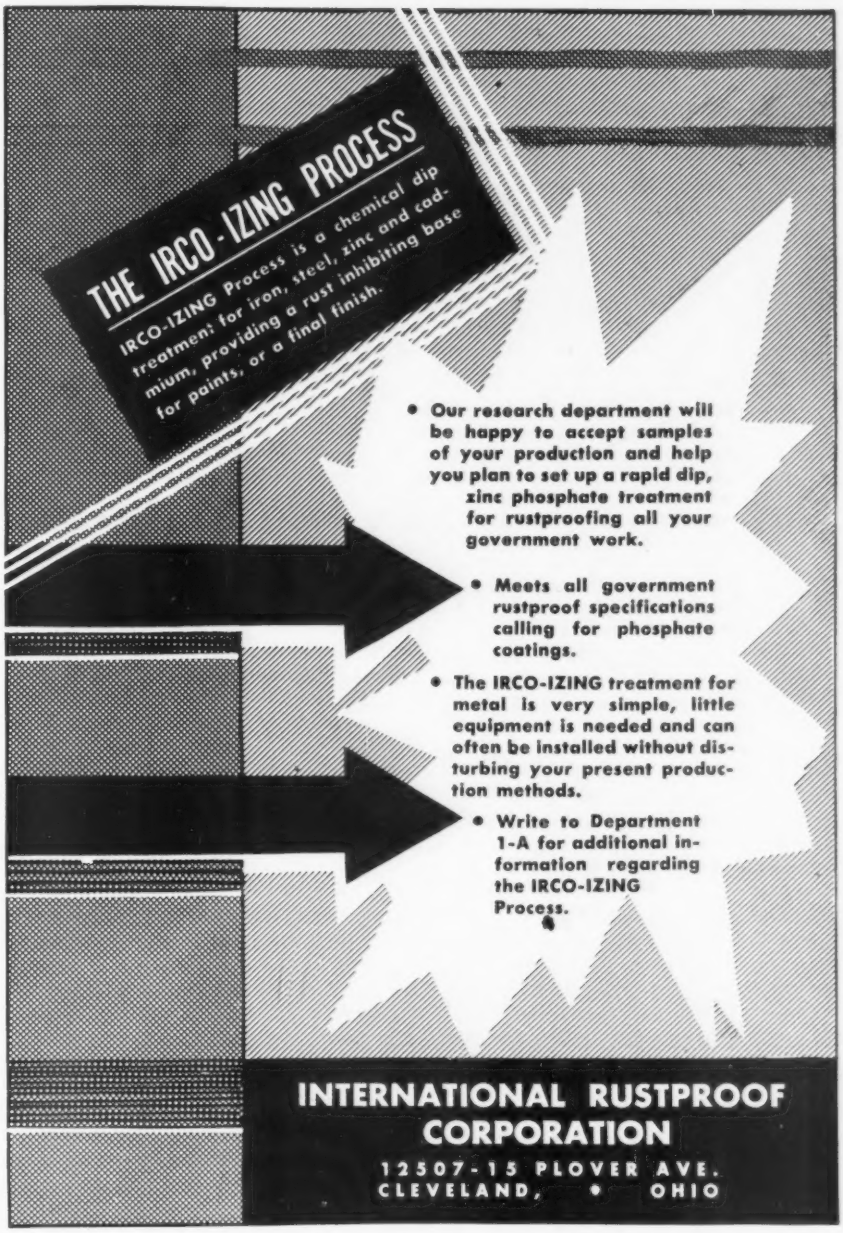
*U. S. Pat. 2,356,944.* D. J. Peeps, assignor to The DeVilbiss Co., Aug. 29, 1944. In a spray nozzle of the type described, a discharge cap substantially semi-spherical in shape and having discharge slots therein, one slot passing from near the forward end or pole of the sphere to one side thereof and another slot in a plane at an angle to the plane of the first slot and on the other side of the sphere with one end also extending to the region of the forward end or pole of the sphere.

### Iron Oxide Pigments

*U. S. Pat. 2,357,096.* P. Fireman, assignor, by mesne assignments to Columbian Carbon Co., Aug. 29, 1944. The method of preparing a transparent brown pigment which comprises, adding to a solution of a ferrous compound a base in proportions such that a few percent only of the iron remains in solution, simultaneously heating the solution to raise the temperature to approximately 110° Fahrenheit and introducing air to agitate the material, discontinuing the application of heat while continuing the introduction of air during a period of from two to three hours, again applying heat when the ratio of ferrous to ferric iron is about 1:3, causing the temperature to gradually rise to about 212° Fahrenheit, holding such temperature until the ratio of ferrous to ferric iron is of the order of 1:15, discontinuing the heating and separating the pigment from the solution.

### Coating Sheets

*U. S. Pat. 2,357,536.* J. F. Morse, assignor to The B. F. Goodrich Co., Sept. 5, 1944. The method of depositing a film of nonmetallic material from a liquid dispersion thereof upon both surfaces of a flexible support of sheet material, which comprises providing a bath of liquid dispersed material, continuously supplying fresh liquid dispersion to said bath at a plurality of positions by copious upwardly directed flow of jets of liquid along the support at the exposed surface of said bath at the level of the surface of the bath, to provide excess liquid material to the bath, permitting the bath to overflow continuously, recovering, filtering and returning overflow of said bath to said jets, and progressively submerging the flexible support in said bath by entrance thereto through one upwardly directed jet and removal therefrom through a second upwardly projected jet.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IRCO-IZING Process is a chemical dip treatment for iron, steel, zinc and cadmium, providing a rust inhibiting base for paints, or a final finish.
• Our research department will be happy to accept samples of your production and help you plan to set up a rapid dip, zinc phosphate treatment for rustproofing all your government work.
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• The IRCO-IZING treatment for metal is very simple, little equipment is needed and can often be installed without disturbing your present production methods.
• Write to Department 1-A for additional information regarding the IRCO-IZING Process.
INTERNATIONAL RUSTPROOF CORPORATION
12507-15 PLOVER AVE.
CLEVELAND, • OHIO


### Pigment

*U. S. Pat. 2,357,721.* B. W. Ailan, Sept. 5, 1944. A pigment having its particles coated with a gel formed of a hydrosol which has been allowed to set, said hydrosol comprising the reaction products of an alkali metal silicate and a member of the group consisting of the aluminates and borates of the alkali metals.

### Paint Applicator and Stippler

*U. S. Pat. 2,357,763.* D. C. Pratt, Sept. 5, 1944. A portable hand tool adapted for the application of liquid paint to surfaces comprising an applicator roller means including an apertured, cylindrical member having end walls and a pile fabric sleeve element disposed over said cylindrical member in engagement therewith, tubular means providing a liquid passageway, said tubular means having a handle portion and having another portion shaped to extend within said cylindrical member longitudinally thereof, means rotatably mounting said cylindrical member on said another portion of said tubular means, an imperforate cylindrical member having closed ends disposed within said apertured cylindrical member in spaced relation to the peripheral and end walls thereof and fixedly mounted on said another portion of said tubular means to provide a liquid chamber in said space, said another portion of said tubular means being provided with a discharge aperture adjacent each end of said imperforate cylindrical member communicating with said chamber for the supply of liquid under pressure to said chamber, and means disposed adjacent said handle portion to control the flow of liquid through said passageway.

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Remember!
that "PREP"
is the most important
part of the process.
"PREP" PRODUCTS
insure preparation that
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paint finish.
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## Business Items

J. A. PROVEN

*S. A. Crosby*, president of the *Sterling Tool Products Company*, Chicago, Ill., manufacturer of portable sanding machines, has announced that at a recent meeting of the Board of Directors *J. A. Proven*, general sales manager, was elected to the position of vice-president. In his new capacity Mr. Proven will be closely associated with Mr. Crosby in the formulation of company post-war policies. He will also continue to head and be responsible for policies relating to sales and advertising.

Joining Sterling Tool Products Company about a year ago, Mr. Proven immediately attracted widespread comment in the trade by his organization and development of Sterling's post-war distribution and selling plans.

Prior to joining the company in November, 1943, Mr. Proven was the assistant sales manager of the Victor Adding Machine Company. He is a member of the Chicago Executives' Club and the Medinah Club of Chicago.

*Mr. J. Hoath Wood*, president of *Standard Varnish Works*, well-known manufacturers of paints, varnishes, industrial finishes and Toch Brothers water resisting compounds, announces that at a recent meeting of the Board of Directors, *Mr. M. H. Corbin* was elected a director of the company and was appointed vice-president in charge of sales of both the New York and Chicago divisions.

Mr. Corbin has been associated with Standard Varnish Works since 1937 in a technical and sales capacity and for many years has been closely identified with the development of organic finishes for industrial applications. For the past two years he has been manager of industrial sales of the New York plant.

A graduate chemical engineer from Le-

high University, Mr. Corbin has held various important positions in the technical and sales branches of the paint, varnish and lacquer industry.

---

Announcement by the *Pittsburgh Plate Glass Company*, Pittsburgh, Pa., that a new paint plant will be erected at Springdale, Pennsylvania, suburb of Pittsburgh, is coincident with a nationwide expansion of this company in improving its production facilities and adding to its equipment. Expansion has occured in all three fields in which the company is actively engaged — chemicals, paint and glass.

The new plant will be located on a 14-acre tract recently purchased and, according to President *H. B. Higgins*, construction will begin as soon as materials and equipment are available.

The plant will service the company's numerous outlets in the Tri-State area which heretofore were supplied through the Newark and Milwaukee paint plants. With its completion, deliveries in the district will be speeded up from a day to a week or more, an important factor to dealers in the Pennsylvania-Ohio-West Virginia area. The company has other paint factories located at Dayton, Detroit, Portland, Los Angeles and Houston.

---

The appointment of *John F. Daley* as general manager of the Pigments Department was announced recently by *E. I. du Pont de Nemours and Company*, Wilmington, Del. Mr. Daley succeeds the late Carl H. Ruprecht.

A native of Wilmington, Mr. Daley was educated in local schools and at the University of Virginia. He joined the company in 1915. He was supervisor of dry color production and later production manager at the Newark, N. J. plant of the company's Pigments Division which became a part of the Krebs Pigments Department in 1935. He was appointed director of sales of the Pigments Department in 1942 and recently has been acting assistant general manager.

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**Workers want *fast* hand cleaners. They don't stop to worry whether they are safe or not. It's up to you to provide safety in hand cleaning – if you want to avoid needless infections or dermatoses.**

***Let us send a liberal sample to be put through a real try-out in your plant washrooms.***

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ACID ADDITION AGENT

**Brings surface active forces into play to form a thin foam that traps acid fumes and spray. This prevents corrosion of surrounding equipment and protects the health of workers—safeguarding expensive installations and keeping labor happy. New literature tells eight additional advantages of using Enthone Acid Addition Agent.**

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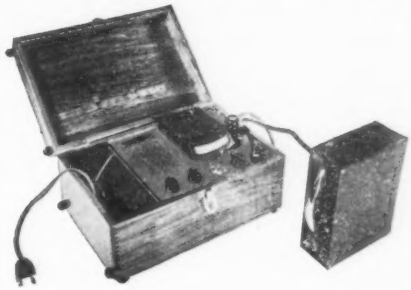
Photoelectric Glossmeter



For measuring the gloss of paint and varnish finishes according to

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Also for

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***Portable, rugged, simple in operation.***

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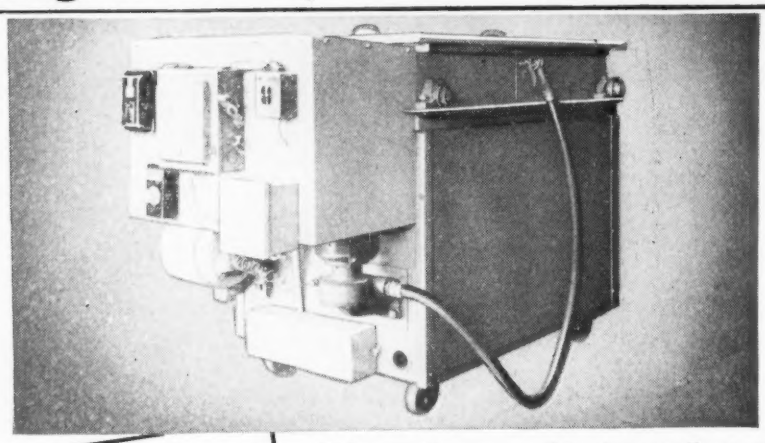
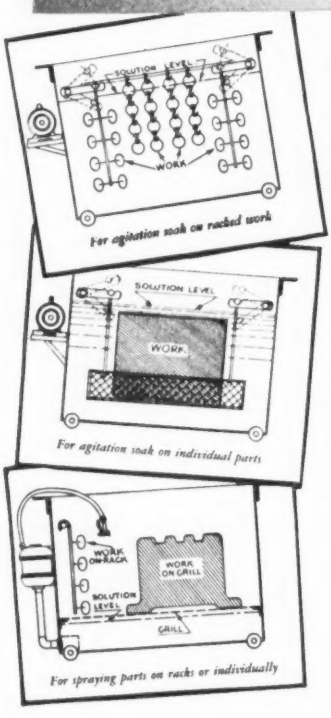
## Get Better, Faster Cleaning with the Magnus All Purpose Cleaning Machine






This new Magnus machine is versatile as well as super-speedy. It can be used to soak (plus a unique method of agitation that cuts cleaning time by large margins)—to spray—or to soak and spray in any required sequence. There's a size of machine that can be set up to handle your cleaning operations far better than anything you have used so far.

### Any Metal—Any Object —Any Cleaner

The machine can be used with any cleaner—petroleum spirits—alkaline cleaners—chlorinated solvents or Magnus Emulso-Dip solutions. It is adaptable to any metal and any size of work. Where required, multiple units can be used to provide for any combination of precleaning washing and rinsing. You can get physically clean or chemically clean work, as the situation demands.

Prices range from $300 to $800, depending on capacity and heating method.

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# Shop Problems

*Question.* What is the cause of pinholing in baking enamels?

*Answer.* Pinholing, or cratering as it is sometimes called, may be due to oil or grease on the surface of the metal. It may also be due to surface drying of the enamel film in the oven. If pinholing persists after cleaning the metal thoroughly, a short air drying period before the finished parts are placed in the oven may overcome the difficulty. If this is not possible for production reasons or if the finish collects dirt during the air drying period, then a change in reducer or in the solvents in the original material is indicated. The use of a slower drying reducer usually eliminates the pinholing. However, the change to a different reducer may affect sprayability and other characteristics of the material and it is suggested that you request information from the supplier of the material.

*Question.* As required by specifications to which our finishing department is working, a coat of chromate primer is applied by spraying before the finish coat. There are occasional complaints about the adhesion of the primer to the metal and, frankly, we cannot locate the source of the trouble. The peculiar thing is that the adhesion varies from good to bad on the same piece. We have checked everything which might have some bearing but have had no success. We are writing to you for your opinion.

*Answer.* The problem you describe is not an uncommon one and, we believe you will find, is due to the application of too much primer. Chromate primers generally give best results when used in thin films — much thinner than those employed with other materials. Since the primer is being sprayed, it is possible to build up films which are much too heavy. If the specifications do not cover the primer film thickness, information on the optimum film may be obtained from the manufacturer.

*Question. In* roller coating terne plate strips with a white enamel which we grind ourselves, we find that the color of the film is much more blue than when the same enamel is applied over other types of metal strip. Can you suggest any means of overcoming this difficulty.

*Answer.* Most white and light colored pigmented finishing materials are not completely opaque when applied at ordinary thicknesses and the final color obtained depends somewhat on the metal over which the materials are applied. In the case you describe it is possible that a small amount of red added to the white will overcome the blueness on the terne plate. If the color of the white on the other surface you mention is yellow, in comparison with the color on terne plate, add blue to the coating to match the blue obtained on terne plate. The exact amount of tinting colors required can be determined quickly by test.

# ODDS and ENDS

### *Old Timers' Dept.:*

The Spring Meeting of *The Electrochemical Society* will be held in Atlantic City. Patriarchs, who were plating back in the days when *Prometheus Salts* and *Trisalytes* were the latest thing and a delicate sense of taste was a prime requisite for solution control, may remember that Atlantic City was the scene of the first symposium on electroplating ever held in this country. April, 1913, was the date, *Prof. Bancroft* presented his "eight axioms of electroplating", which still hold true, and *George Hogaboom* gave a paper on unsolved problems, several of which still haven't been solved, although a good deal of water has flowed under the bridge and a good deal of plating solution has been given the sewer treatment since that momentous meeting.

### *In the Editor's Mail:*

*Adolph Cohn* (Sigmund Cohn & Co.) points out that in both the 1943 and 1944 editions of the *Plating and Finishing Guidebook*, the tables give the value of a millimeter as 100 microns instead of 1,000. We checked further and found that this error has been repeated each year for the past six years, occurring for the first time in the 1939 edition. Another few years and it might have become legal!!

*Nick Ellitch* inquires whether the article on "Health Hazards Connected with Cadmium Plating" by *Neal*, *Fairhall* and *Soderberg* is typical of work distribution in government offices—three authors for one half-page article. Don't ask us, ask *Gus Soderberg*!!

In a recent letter from the Pacific, our own *Lt. Palmer Langdon* remarks that the *American Chemical Paint Co.* ad in the August issue conveys the idea of the WET season out there better than any picture he has seen—even gives him that sensation of "water dripping off banana leaves . . ." Imagine that guy in the hot, humid, infested, poisonous jungles noticing water dripping off the banana leaves!! A born poet!!

From *Don Wood* (National Silver Co.) in reference to our question on this page in the October issue as to whether aluminum *exactly* 0.005" thick is called sheet or foil:

> "You know very well there is no such thing as a sheet 'exactly 0.005" thick' so why worry about it. You remind me of the fellers used to talk about a surface being chemically clean."

We don't know from nothin'!—except that from now on we're going to recommend the *Gardam* solution for plating on stainless steel instead of the *Wood* solution. That should teach Don that the editor is not only a worrier but is extremely sensitive to criticism.

### *The Printed Page:*

We note that the latest in drying oils is *Fanweed Oil*, which is also claimed to be suitable for lubricants and as a salad oil. Brings to mind the remark made a couple of years ago by *W. H. Gardner*, when the government started to divert linseed oil from paint use to food applications, to the effect that "*You can't have your paint and eat it.*"

To the field of *Floor Engineering* (polishing and waxing floors), is now added *Nutritional Engineering*, noted in a recent issue of the *Journal of the Franklin Institute*. If our barber ever puts out a sign calling himself a *Tonsorial Engineer*, so help us, we'll send in a complaint to the *State Board of Professional Engineers*!

Riding in the subway one day, we happened to glance over the shoulder of a fellow standee and were surprised, to say the least, to see a headline in his paper reading: "*Platers Make Good Time at Belmont.*" We do not know of any plating plants in Belmont and, even if there were, they are being paid to produce. However, we noticed that the item appeared on the sports page so it may be possible that *selling* platers and Belmont *track* were meant.

### *Slogan of the Month:*

**No Horse Can Go as Fast as the Money You Bet on Him — Buy War Bonds Instead!**


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*Also*
RIPPLE
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*Polishing Wheels and Burring Bobs for every Operation*

We are engaged essentially in War Work

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# Order Now
# Wide Range of Equipment Available*

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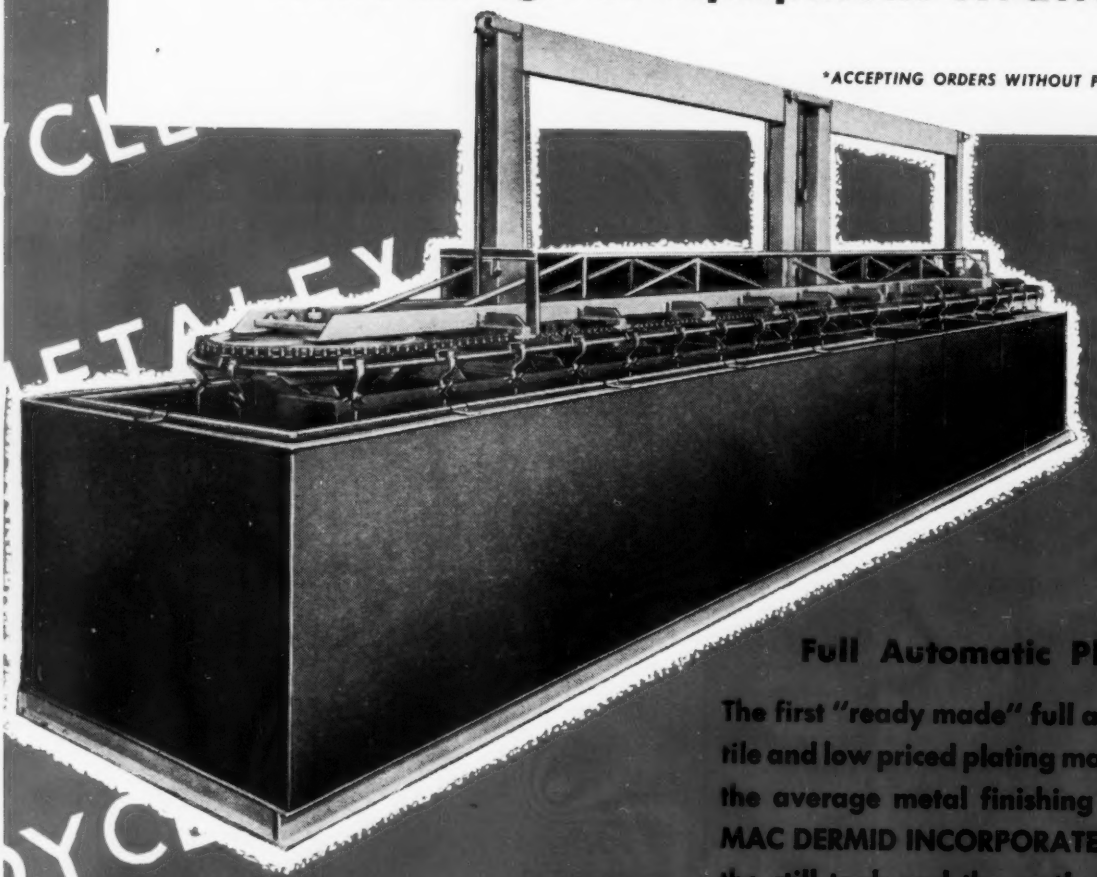
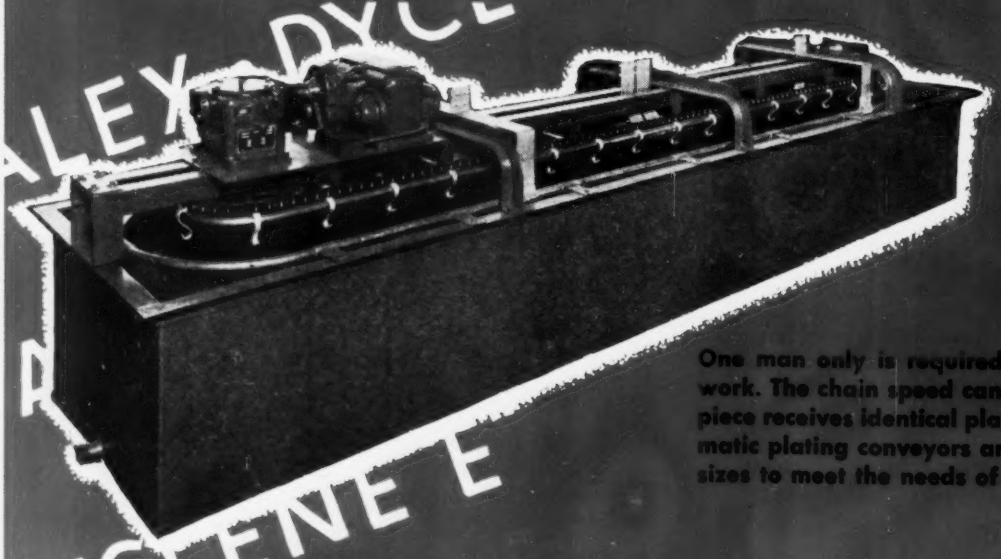


## Full Automatic Plating Machine

The first "ready made" full automatic, compact, versatile and low priced plating machine within the means of the average metal finishing plant. Recommended by MAC DERMID INCORPORATED to fill the gap between the still tank and the costly, specially built full automatic—it more than does this job! Its compactness, easy movability and low cost encourage its use in multiple units or batteries, affording an infinitely greater flexibility of usage. The compact feature standardization enables shipment in one freight car in assembled condition . . . Write for Free Detailed Folder.

## Hand Operated Plating Equipment

Hand operated plating tanks available for use in small lot operations wherever one of the larger semi or full automatic conveyors are not economically necessary. These tanks can be either Koroseal lined or rubber lined with a coating approved for any bright nickel solution. The nickel tanks may be equipped with cathod rod agitator for high current density plating.



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The principal advantages of this equipment are savings in labor, close production and plating control. The conveyor carries plating work to and away from the operator who stands in one spot loading and unloading the machine. One man only is required for handling large quantities of work. The chain speed can be closely regulated so that each piece receives identical plating treatment. Udylite Semi-Automatic plating conveyors are made in a very broad range of sizes to meet the needs of the individual customers.

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This 4-page Service Report describes how Oakite CrysCoat No. 86, an integral part of the Oakite CrysCoat Process, in ONE time-saving operation (1) removes light oils, grease, shop dirt and other foreign matter; (2) inhibits surfaces against rusting while parts are being held for painting; (3) imparts a microscopic crystalline coating to ferrous surfaces that assures TENACIOUS GRIPPAGE of paint or other organic finishes.

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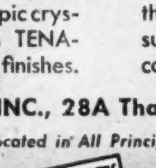


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OPENING UP

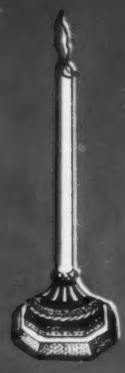
# A New Year

Christmas 1944

*We Salute*

*metal finishers everywhere--as we begin our sixty-second year of continuous service to the metal finishing industry--and extend to you our sincere good wishes for a prosperous and victorious*

*New Year*



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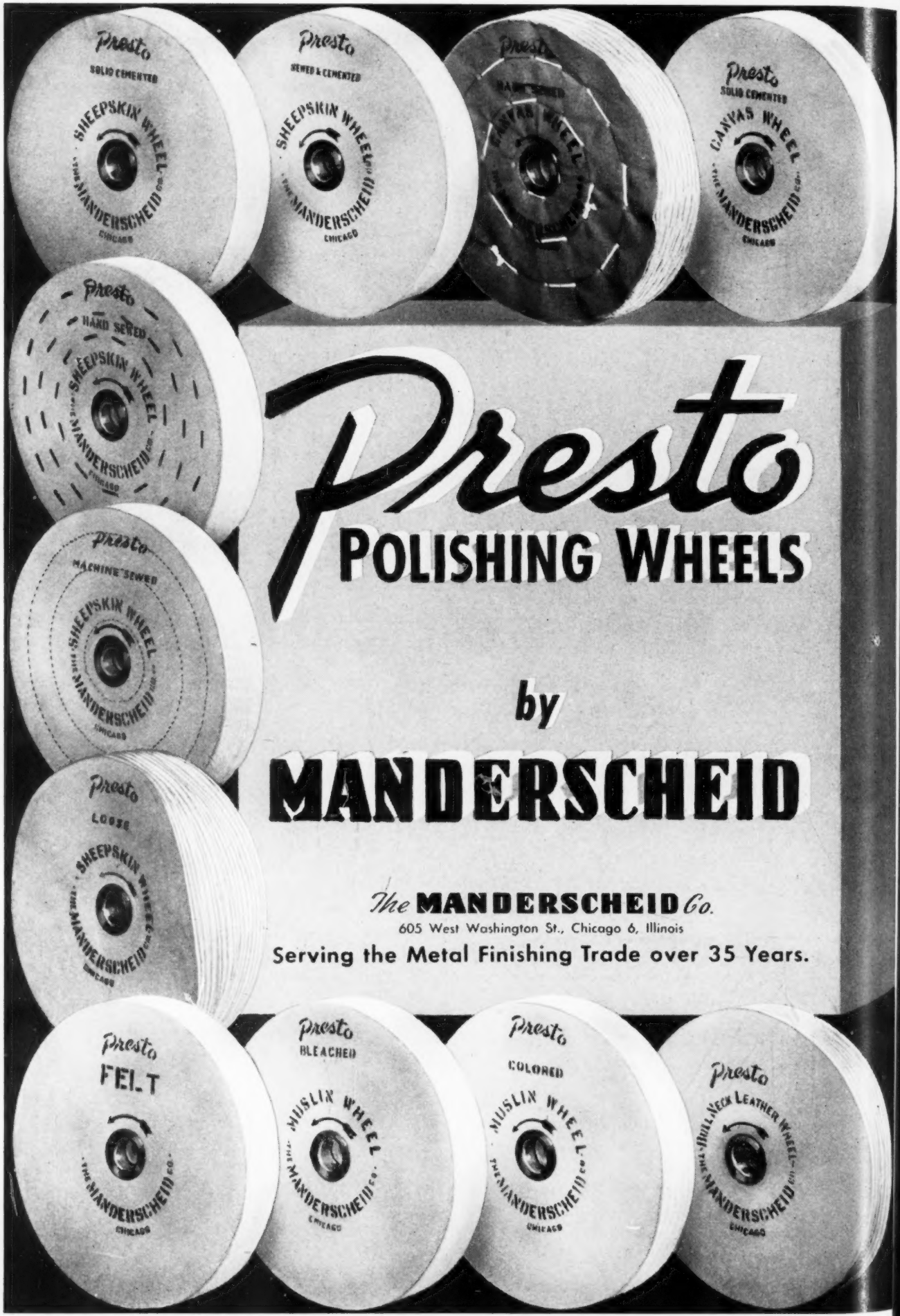
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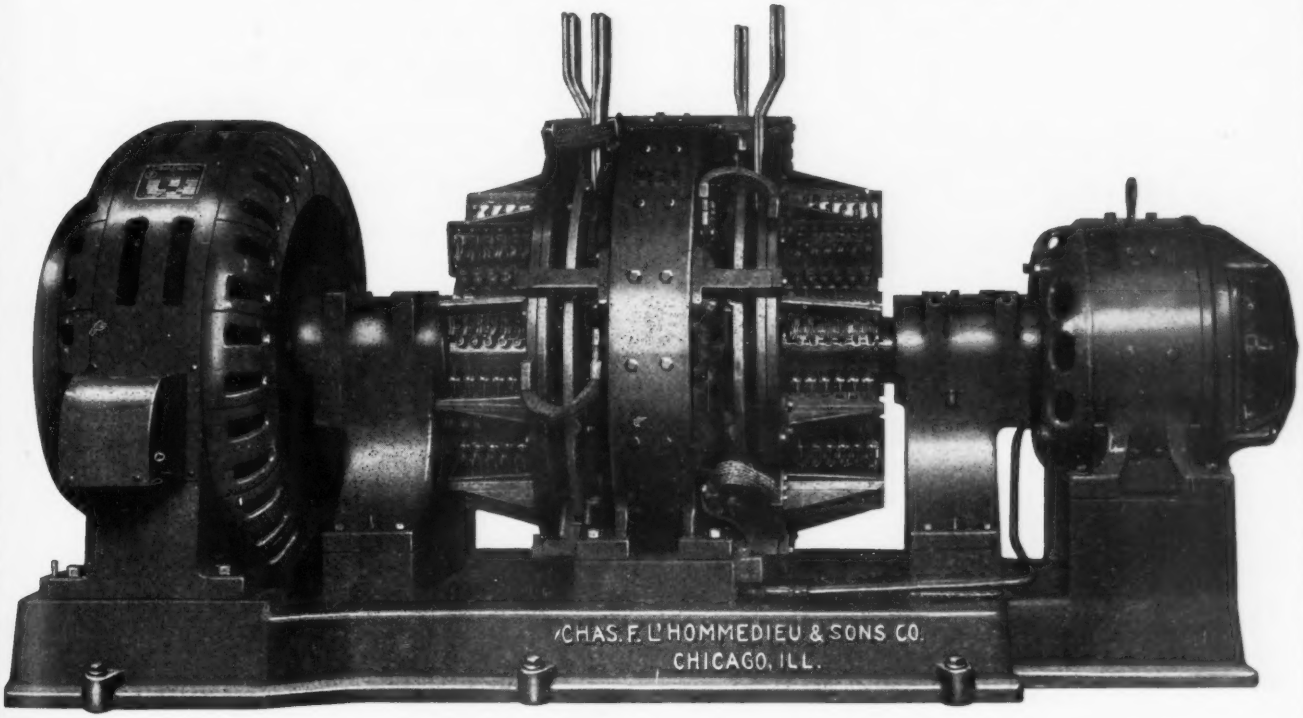
**Electro-Plating & Anodizing**

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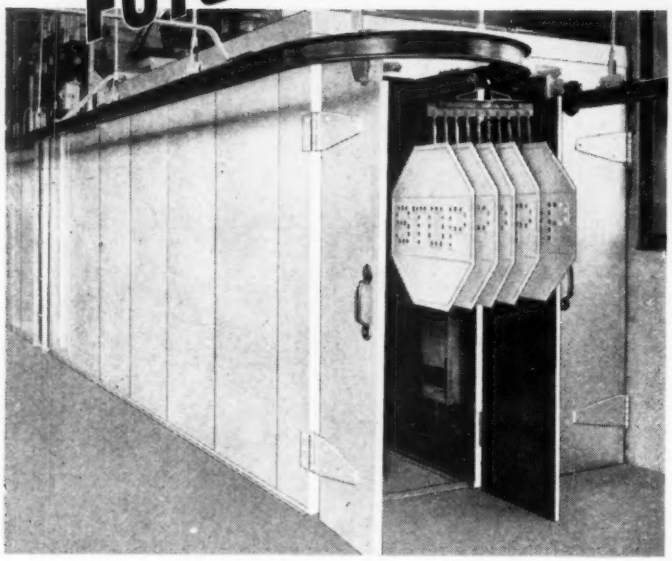


## with KIRK AND BLUM Industrial Ovens

In the coming post-war "battle for markets" competition will be keener than ever before in our history. What of your product finishing equipment . . . will it be able to carry on under the increased load, meet new and higher finishing standards, enable you to take utmost advantage of post-war opportunities?

It will pay you to make a thorough check-up *NOW*. And should your plans require new product finishing equipment, it will pay you to avail yourself of Kirk & Blum's 37 years of specialized engineering experience.

The Kirk & Blum Engineering Staff is thoroughly grounded in the planning, design and erection of complete finishing equipment. These systems are guaranteed to increase production, reduce fuel and labor costs, conserve floor space, promote maximum safety.

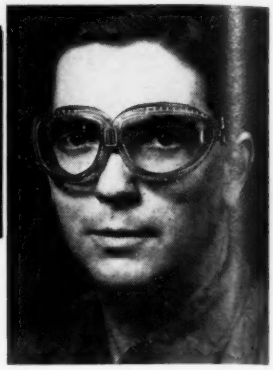
*Send for Booklet—"INDUSTRIAL OVENS"*

THE KIRK AND BLUM MFG. CO.

2859 SPRING GROVE AVE. CINCINNATI 25, OHIO

# M·S·A EYE PROTECTION FOR THE METAL FINISHING WORKER

## LOOKS ALL PLASTIC GOGGLES



***Light Weight— Wide Vision—Comfort***

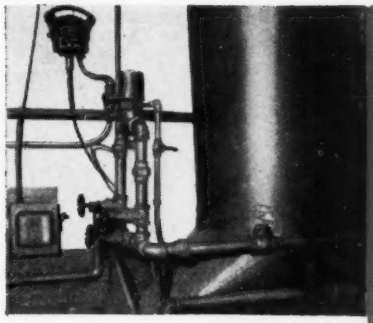
These new lightweight all-plastic goggles afford wide vision and comfortable eye protection against light-flying particles. LOOKS are strong and durable, yet low in cost. The large "aviation-type" lenses of polished acetate are easily replaceable. Furnished in three models: the direct-ventilated General Purpose Model with clear lenses; the General Purpose Model with green lenses; and the Dust Model with indirect ventilation and clear lenses. Write for Bulletin No. CE-25.

## M·S·A GOGGLE CLEANING CABINET

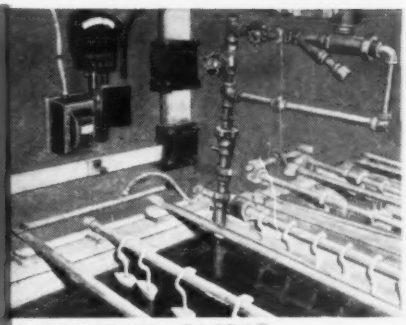
***Convenient— Compact— Time Saving***

The M.S.A. Goggle Cleaning Cabinet encourages the worker to wear his goggles and keep them clean. A tap of the finger releases the right amount of Fogpruf—an efficient cleaning and anti-fogging agent on the goggle lenses. Convenient Optical Wiping Tissues and waste receptacle are provided within this handy cabinet. Designed for wall mounting. Write for Bulletin No. CE-24.

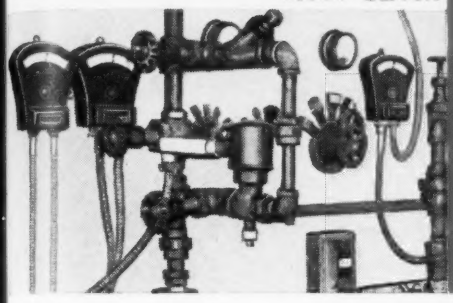
**MINE SAFETY APPLIANCES CO.**
**BRADDOCK, THOMAS AND MEADE STREETS**
**PITTSBURGH 8, PA.**

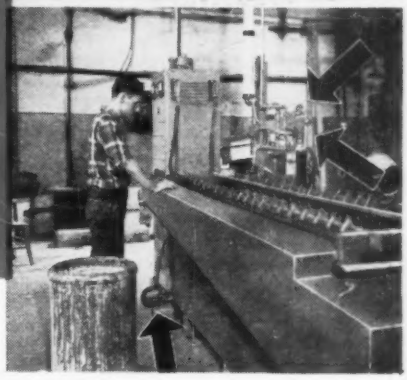


ANODYZING
MOLY BLACK



HIGH SPEED COPPER
CHROME





# HEATING AND COOLING CONTROLS

## *Low cost - High accuracy*

From high speed copper to chrome, and anodyzing to cleaning and rinsing tanks, Sarco has a complete line of temperature controls. The cost varies according to the problem involved, but for the purposes illustrated the simple, inexpensive Sarco LSI Electric Control will do the trick.

It combines accurate temperature indication with automatic control. It is used extensively for both heating and cooling because it costs less, is more reliable and because of the easy adjustment by thumb screw and the built-in dial thermometer.

This is only one of the many Sarco plating controls which range from the low cost Sarco Thermoton, for approximate control of cleaning and rinse tanks, to the highly accurate TR-21 regulator used on many automatic plating operations.

Our representative can show you how others have solved plating problems similar to yours.

**SARCO COMPANY, INC.**
**475 FIFTH AVENUE**
**NEW YORK 17, N. Y.**

*Represented in Principal Cities*

**SARCO Saves Steam**

**SARCO CANADA, LTD., 85 Richmond Street, West, TORONTO, ONTARIO**

# CONSERVATION . . . THROUGH pH CONTROL

Screed hooks, form clamps and most other small steel parts used in concrete construction work are ready for the junk heap after one job even though there's nothing wrong with them that cleaning can't fix.

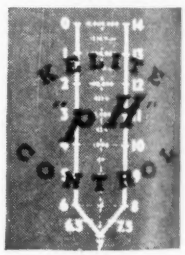
These parts are heavily coated with concrete and eaten with rust. Dirt, scale and paint add to the difficulty of cleaning. Ordinary chemical cleaning falls far short of removing this stubborn conglomeration of deposits and corrosion and sets up the metal surfaces for ruinous attack by rusting. "Rattling" cleans the parts in a rough fashion, but it can never remove all the dirt and rust and it damages many of the parts.

The C. P. Concrete Equipment Company of Los Angeles is successfully cleaning thousands of these parts by simple immersion in a series of cleaning baths set up by a Kelite Service Engineer. This new process reclaims parts like the screed hooks above . . . cleans them and protects them against re-rusting . . . without requiring expensive equipment or skilled labor.

A simple series of immersions is all that is needed to make these metal parts as useful as though they were brand new. They can be delivered to concrete contractors for use on new jobs at a great saving in man hours, money and metal.

This is a typical application of scientific cleaning through pH Control. Wherever there's dirt, grease, grime, scale, corrosion or any other undesirable deposit or contamination, Kelite materials with pH Control can solve the cleaning problem.

Chart Copyrighted 1942




KELITE PRODUCTS, INC.

Call or write for the Kelite Service Engineer who serves your territory with a practical knowledge of scientific cleaning through pH Control.

KELITE

SCIENTIFIC CLEANING THROUGH pH CONTROL

KELITE PRODUCTS, INC. 909 E. 60th ST., LOS ANGELES 1, CALIF.

MFG. PLANTS IN LOS ANGELES, CHICAGO, PERTH AMBOY, HOUSTON • BRANCHES IN ALL PRINCIPAL CITIES

SACRAMENTO, SAN BERNARDINO, LOS ANGELES, SAN DIEGO, PHOENIX, SALT LAKE CITY, DENVER, EL PASO, SAN ANTONIO, FORT WORTH, HOUSTON

# FOR BETTER · FASTER · MORE EFFICIENT FINISHING ROOM OPERATION . .

## DEPEND ON LASALCO!

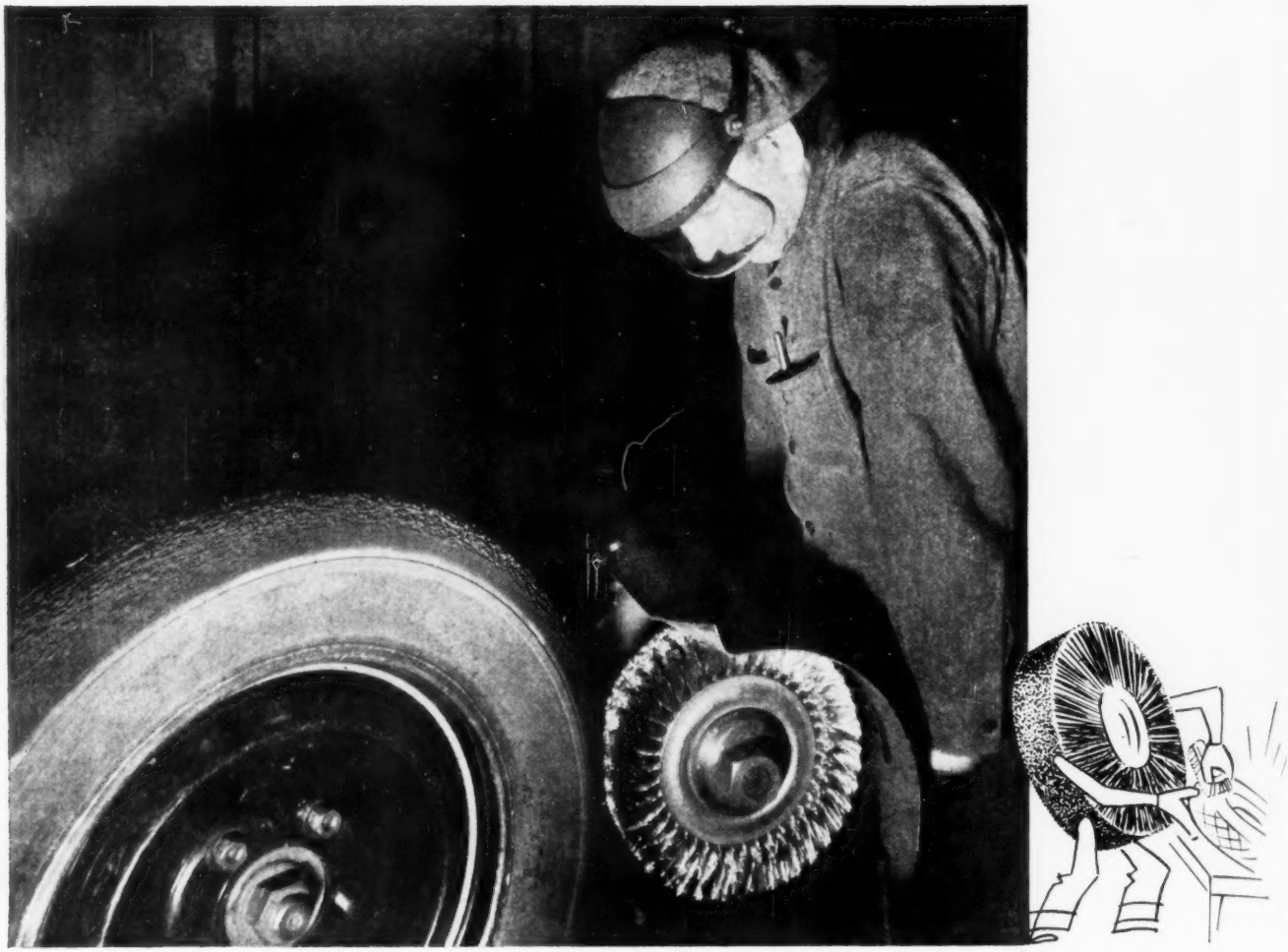
Lasalco Engineers can solve your plating and finishing problems as they have for hundreds of other manufacturers, both small and large.

Whether a single unit or a complete plant layout is required to do your job, the Lasalco Engineer knows what is needed. From a vast experience he has the answer to help lick your problem . . . FAST . . . and get it right the first time.

Consult Lasalco without obligation. Their engineers and electrochemists offer gladly their counsel and aid. Write freely about your problems—for immediate attention.

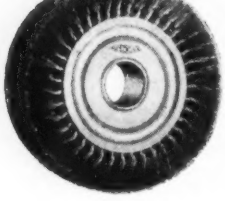
## LASALCO, INC.

2818-38 LA SALLE STREET ST. LOUIS 4, MISSOURI



# The brush that recaps tires...

## *and helps make new ones*



TIRE recapping, so vital an operation today, is best performed by using a special Osborn retreading brush for roughening the surface of the tire to get the maximum adhesion in vulcanizing . . . *without breaking the cords!* Tires thus prepared are uniformly and properly roughened . . . there are no weak spots, no broken cords . . . and the tires wear longer.

Power brushing has been *proven* during wartime one of the most versatile of all tools—used in practically every industry on every product for every surface finishing operation.

Moulds for making new tires, too, are best cleaned by power brushing—resulting in a better looking, better performing product. Tire valves are finished by brushing before they are bonded to the rubber. The resulting smooth finish leaves no ragged edges to injure precious inner tubes.

Whatever you make now—or intend to make in the future—*whether it's made of rubber, metal, fabric or plastic*—it will pay you to investigate the contribution that power brushing, as developed by Osborn, can make to your product. You'll get greater uniformity, better looks and better performance at a lower unit cost—with Osborn power brushing.

Write The Osborn Manufacturing Company now and a trained field engineer will make a study of your present and projected operations—without obligation.

**THE OSBORN MANUFACTURING COMPANY**

*5401 Hamilton Avenue* *Cleveland, Ohio*

**Osborn Brushes**

WORLD'S LARGEST MANUFACTURER OF BRUSHES FOR INDUSTRY

# Scoop Competition WITH UNICHROME* Alkaline Copper

## THE PROCESS THAT STEPS UP PLATING OUTPUT OF SMOOTH, DUCTILE DEPOSITS

There's far more than wartime usefulness to Unichrome Alkaline Copper. Many plants are installing this output-boosting process today with a canny eye on civilian applications. They know that the greater speed and efficiency of this process . . . its money saving features . . . will give them the inside track on post-war competition. Here are the production advantages of Unichrome Alkaline Copper that merit consideration by any plant doing copper plating now, or planning to *after Victory.*

Unichrome Copper deposits are exceptionally smooth and lustrous . . . provide an excellent base for bright nickel without buffing. When plating over rough base metal, buffing is done in less time, using less pressure and fewer materials.

In many plants today this process boosts production because of the excellent plating speeds obtained. Free from scum, the deposit needs no activation before subsequent plating. Ordinary cleaning cycles are adequate.

Heating requirements and heat losses are lessened in the moderate temperature bath—100° to 140° F. Bath is stable, has a wide operating range, is free-rinsing and doesn't deteriorate or build up with carbonate. It's easier on stop-off materials too. 100% anode and cathode efficiency. The solution contains no cyanide, is non-toxic, won't attack clothing or equipment. Your existing facilities can be easily converted for use with this process.

### *Send for this Descriptive Leaflet*

It gives all the advantages of Unichrome Alkaline Copper . . . as well as characteristics . . . plating speed tables . . . important technical data. Kindly outline your needs to assist us in answering more fully.

### OTHER U. C. PRODUCTS AND PROCESSES TO SERVE YOU

**CHROMIUM PLATING** for wear-resisting, oil-retaining and other types of finishes.

☆**ANOZINC** for anodic treatment of zinc giving greatly increased corrosion-resistance and an attractive black or yellow finish.

☆**UNICHROME STRIP** for speedy removal of copper, chromium, zinc, etc., from steel and cast iron without etching the base.

☆*Reg. U. S. Pat. Off.*

☆**UNICHROME RACK COATINGS** specially formulated to stand up under the most severe operating cycles.

☆**UNICHROME STOP-OFF LACQUERS AND COMPOUNDS** specially formulated to meet specific plating problems.

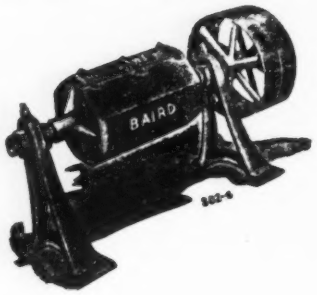
☆**UNICHROME CLEAR LACQUERS** specially formulated to meet specific finishing requirements.

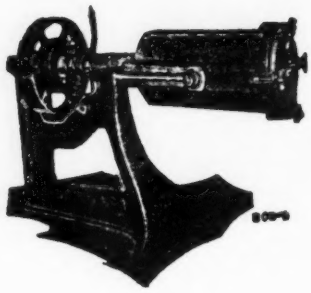
☆**UCILON** — a corrosion-resistant coating for protecting surfaces against acids, alkalies, water, gasoline and various corrosive chemicals.

**UNITED CHROMIUM**
**INCORPORATED**

51 East 42nd St., New York 17, N. Y.
Waterbury 90, Conn.
Detroit 7, Mich.

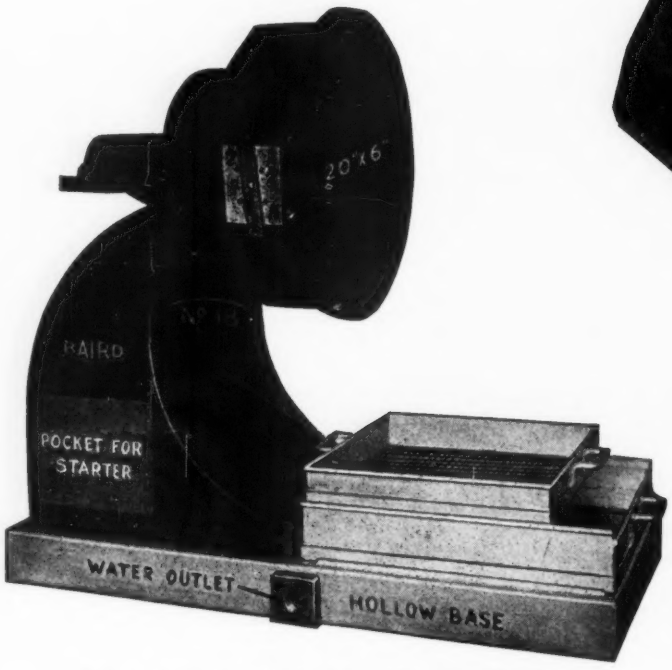
# DEBURRING - A new name for an old process for which BAIRD TUMBLERS have been used for well over 50 years.



**NON-TILTING HORIZONTAL BARRELS**

**TILTING HORIZONTAL BARRELS**




This shows a High and Narrow Type of Barrel mounted on "Baird" Model D. or Pedestal Type Motor driven Oblique Tilting Tumbler.

Barrels for "Deburring."

Barrels for burnishing by using glasshard highly polished steel balls.

This shows the side of a No. 1 BAIRD Model D. Single Oblique Tilting Tumbler with a No. 22 Sheet Steel Polygonal Barrel and with an Automatic Electrical Tilting Device.

**When tumbling questions come up "ASK BAIRD ABOUT IT"**

AUTOMATIC MACHINERY BAIRD STRATFORD CONNECTICUT, U.S.A.

## THE BAIRD MACHINE COMPANY

**STRATFORD, CONNECTICUT, 9.**

**Since 1846 specializing in high production machinery for articles of wire and for ribbon metal. Also machines to turn, bore, etc., castings, forgings, etc., up to 10½" diameter.**

# *Industrial Plating*

# FILTERS

**For Bright Nickel, Nickel, Chrome, Copper Sulphate, Cyanide Copper, Brass, Zinc, Cadmium, High Speed Copper, Brite Zinc, Silver, Electrocolor and others;**

***Offer You Many Important Advantages . . .***

★ **PERFECT CLARIFICATION**
Ultra fine filtration — *GUARANTEED!* Industrial filters offer an ideal system for removal of carbon, clays, or lime from treated solution in process of eliminating iron, organic impurities, oil, etc.

★ **LARGE FILTER AREA**
This feature means rapid action and longer filter cycles. Flow rates are always governed by the filtration area within the filter.

★ **LARGE FILTER CHAMBER**
Means greater sludge holding capacity. A plating filter having a large chamber will not require frequent cleaning, due to becoming quickly packed with sludge.

★ **CLOSED FILTRATION**
Filter plates are locked in leak proof chambers. There is no loss of valuable solutions with Industrial Filters.

★ **AUXILIARY SUCTION**
Industrial filters give you a direct means of introducing filter aids in the process of filtering and purifying solutions.

***Be Sure You Get All These Features In the Filter You Buy!***

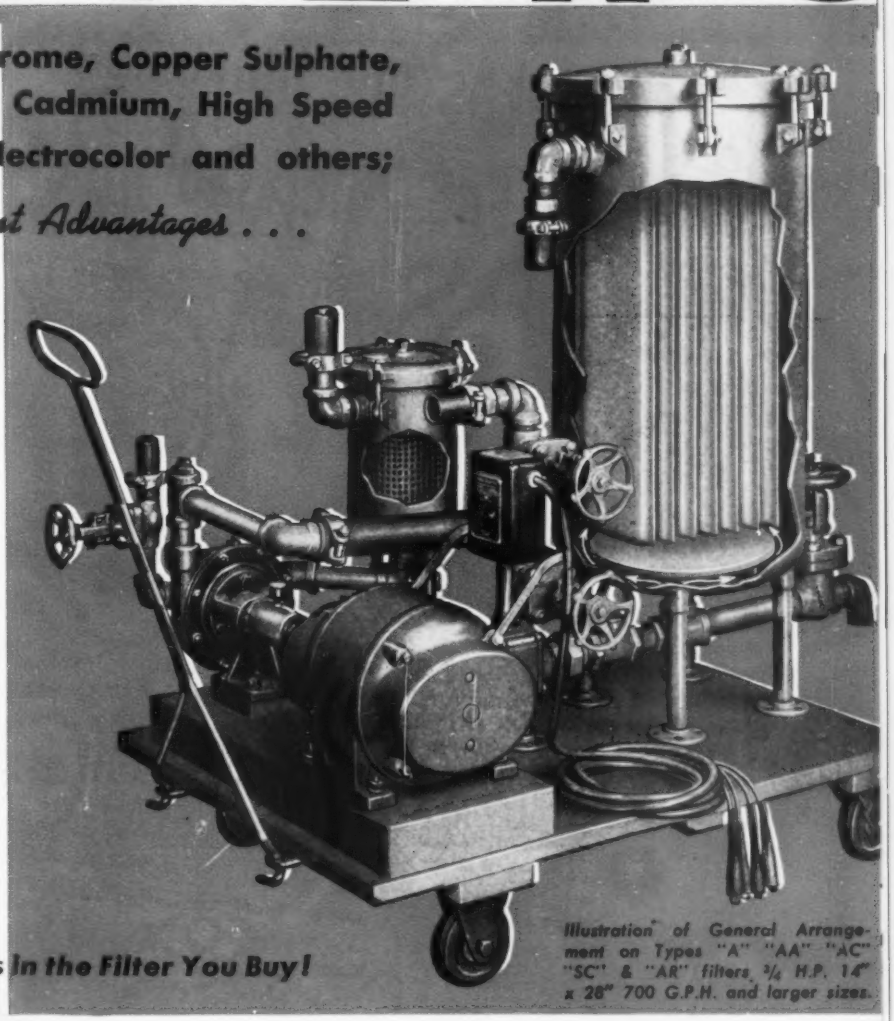


*Illustration of General Arrangement on Types "A" "AA" "AC" "SC" & "AR" filters ¾ H.P. 14" x 28" 700 G.P.H. and larger sizes.*

# SALT FOG
## *Corrosion Test Equipment*

This modern instrument is designed to meet all requirements of latest "Salt F Testing Procedure Specifications" to determine corrosion resistance of plat coated, lacquered or painted parts.

Serious rejection losses on industrial finishes which must meet Army or Nc specifications are avoided by systematic tests with Industrial Salt Fog T Equipment.

**STANDARD SIZES**

**No. 1—48" long 26" wide 36" deep No. 3—30" long 18" wide 30" de**
**No. 2—36" long 24" wide 30" deep No. 4—24" long 15" wide 30" de**
**No. 6—14" long 12" wide 12" deep**

**We Carry Complete Stocks of Filterbestos, Activated Carbon, Activated Clay, (Super-Filtrol, and Chlor-o-cel) and All Grades of Filter Powder Ready For Shipment**

# INDUSTRIAL FILTER & PUMP MFG. CO.

1621-25 WEST CARROLL AVENUE CHICAGO 12, ILLINOIS

ANACONDA
from mine to consumer
Pyrene
FIRE EQUIPMENT FOR EVERY HAZARD
Firestone
HAMILTON STANDARD
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UNITED AIRCRAFT CORPORATION
PROPELLERS
Martin
AIRCRAFT
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BULOVA
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*PNEUMATIC-HYDRAULIC (AIR-OIL) SHOCK ABSORBING LANDING GEAR
REMINGTON RAND INC.
SPARTON
Radio's richest voice since 1926
Western Electric
York
refrigeration
air conditioning
Robertshaw
WILLIAMS
OIL-O-MATIC
HEATING
OTIS ELEVATOR

# Lasting Corrosion Resistance + Beauty For Zinc, Cadmium Plated Products

*Send now for a sample panel of Iridited plating to test in your own laboratory.*

WHEN leading manufacturers want an attractive corrosion-resistant final finish, they choose the best. That's why these "big names" . . . and many others . . . are using Iridite on the zinc or cadmium surfaces of their wartime and consumer products.

Proved on the warfronts and in major testing laboratories, Iridite means longer life for zinc and cadmium surfaces . . . opens vast new fields of use for those metals. Applied by brief dipping at normal shop temperature, Iridite dries in a few seconds . . . permits immediate handling, packing and shipping. No slowing up of fast-moving production lines working to fill war or civilian orders!

**Iridite Colors Add Real Beauty**

Iridite is now available in a wide range of attractive colors that make products even more salable. Included are blues, greens, maroons, bronze, black, blue-black, and olive drab. Iridite colors don't vary or fade. And because of Iridite's excellent qualities as a paint base, all colors can be clear-lacquered for even greater durability.

**Test Iridite For Your Products!**

Iridite may be the "finishing touch" for *your* products. We urge you to test for yourself this proved and widely specified new process. Send now for a sample panel of Iridited zinc plating to test in your own laboratory . . . together with full information and operating details. Write, phone or wire today. Address: Rheem Research Products, Inc., 512 Chemical Building, 2523 Pennsylvania Ave., Baltimore 17, Md.

RHEEM RESEARCH PRODUCTS, INC.
IRIDITE
2523 Pennsylvania Ave., Baltimore, 17, Md.

Branch Offices— 20 E. Jackson Blvd., Chicago, Ill.; 2411 Sichel St., Los Angeles 15, Cal. New England Distributor: MacDermid Incorporated, Waterbury 88, Conn.; Grand Rapids Distributor: J. C. Miller, Grand Rapids 4, Mich.; Detroit Distributor: Wagner Bros., Detroit 2, Mich.; Cleveland Distributor: McGean Chemical Co., Cleveland 15, O.

# NEWS FOR POLISHERS

## EW POLISHING WHEEL CEMENT—GRIPMASTER—STEPS UP OLISHERS' PRODUCTION AVERAGE OF 47% MORE PIECES PER HEAD

**MANY USERS REPORT INCREASES OF 100%, 200%, 300% and MORE!**

### Amazing *New Kind* of Polishing Wheel Cement Eliminates "Glazing," Locks in Grains of Emery with New "Vise-Tight" Control, Gives You New Flexibility Never Believed Possible!

**★ POLISHING NOW MADE MORE PROFITABLE**

After over two years of research, here, at last, is the remarkable *new kind* of polishing wheel cement you have been waiting for. Extensive plant tests reveal that this new production-booster—GRIPMASTER—steps up polishers' production an average of 47% *more* pieces per head. One plant, polishing an intricate aircraft part, reports that GRIPMASTER now makes it possible to polish *16 times as many* pieces per head as does the next most efficient adhesive obtainable!

**★ WHY GRIPMASTER IS FAR MORE EFFICIENT**

GRIPMASTER contains a secret new high-heat resisting ingredient. It does not "glaze" on the wheel. Its surprising new adhesive action *locks in* the grains of emery with new positive "vise-tight" control. Your stops for wheel changes are cut to a fraction! GRIPMASTER dries quickly at *room temperature:* oven heating is no longer necessary! And, thanks to GRIPMASTER'S greater flexibility, you get more and finer "breaks" when the wheel is "cracked." Result: far better finishes!

**★ *ONE* GRADE GRIPS *ALL* GRAINS**

Yes, *one grade* of GRIPMASTER grips *all* grains—250 to 20. It is even possible to "oil out" with GRIPMASTER. Nor is a special sizer necessary. With the addition of water only, GRIPMASTER serves as its own sizer! Profit from this amazing new discovery now. Clip and mail the coupon at the right for your *free* one gallon sample of GRIPMASTER *today!*

**JOBBER INQUIRIES INVITED**

# FREE!

**FOR LIMITED TIME ONLY**
**FULL ONE GALLON SAMPLE!**

*DISCOVER* for yourself how GRIPMASTER can step up *your* production. Clip and mail this coupon *now!*

GRIPMASTER DIVISION
Michigan Bleach and Chemical Co.
1944 E. Woodbridge Avenue
Detroit 7, Michigan

Gentlemen:

Please send me—*without cost or obligation*—a FREE one gallon sample of GRIPMASTER to test on my own jobs.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

**JUST ATTACH TO YOUR LETTERHEAD AND MAIL. DO THIS NOW—TODAY!**

# GRIPMASTER

PAT. PEND.

**POLISHING WHEEL CEMENT**

GRIPMASTER DIV., MICHIGAN BLEACH and CHEMICAL COMPANY
1944 E. WOODBRIDGE (INDUSTRIAL CHEMICALS) DETROIT 7, MICH.

Hammond OF KALAMAZOO

TRIPLE THREAT VERSATILITY...
TO HELP YOU SOLVE YOUR PROBLEMS

1. POLISHING
2. BUFFING
3. COLOR BUFFING

Hammond
VARIABLE SPEED
POLISHING-BUFFING
LATHES

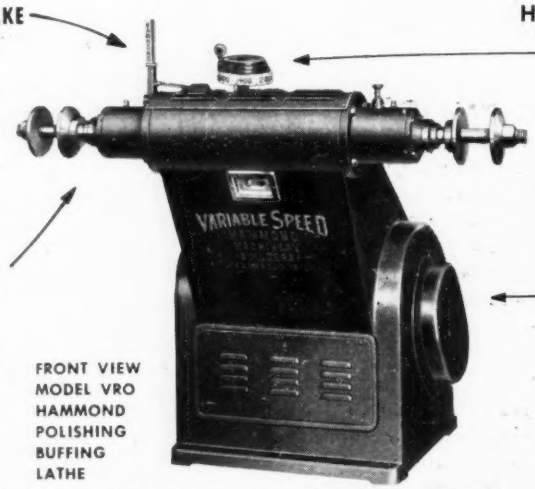
THESE FACTS ARE ESSENTIAL TODAY—They are Tomorrow's Necessities!

**Combination SWITCH and BRAKE**

Foolproof operation and complete safety provided. To start machine push lever backward releasing brake, then operator must push start button at front of machine. By pulling forward on lever brake is applied to spindle and thus breaking control current. Supplied as standard equipment.

**OVERHANGING SPINDLE GREATER WORKING AREA AROUND THE WHEELS**

The spindle and bearing housing are assembled as a unit. This entire unit can be quickly removed from the pedestal without disturbing bearings or subassembly parts. Extra heavy, one-piece spindle provides smooth vibrationless operation.




FRONT VIEW MODEL VRO HAMMOND POLISHING BUFFING LATHE

HERE'S YOUR ANSWER

**The DIAL does it!**

1500 to 3000 RPM instantly. For finer, better, more uniform finishes and maintenance of constant peripheral speeds as the wheels wear down. Easy, quick, fingertip control provides wider range of work you may handle.

**MOTOR-IN-THE-BASE**

5 and 7½ HP capacity for continuous two-man operation. The Hammond Polishing and Buffing Lathes are built to the high standard of quality demanded by present day high production. They are tomorrow's necessities to help you reduce your costs.

*Other Hammond Products:* Automatic and Cylindrical Finishing Machines • Carbide, General Purpose and Abrasive Belt Grinders

1601 DOUGLAS AVE.

Hammond Machinery Builders INC.

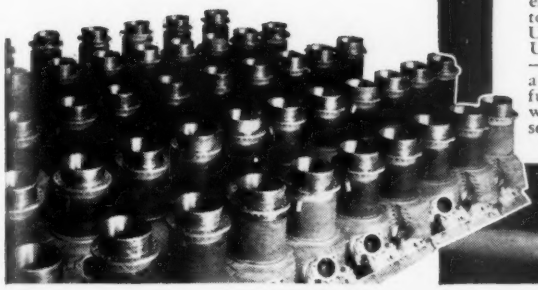
KALAMAZOO 54, MICH.

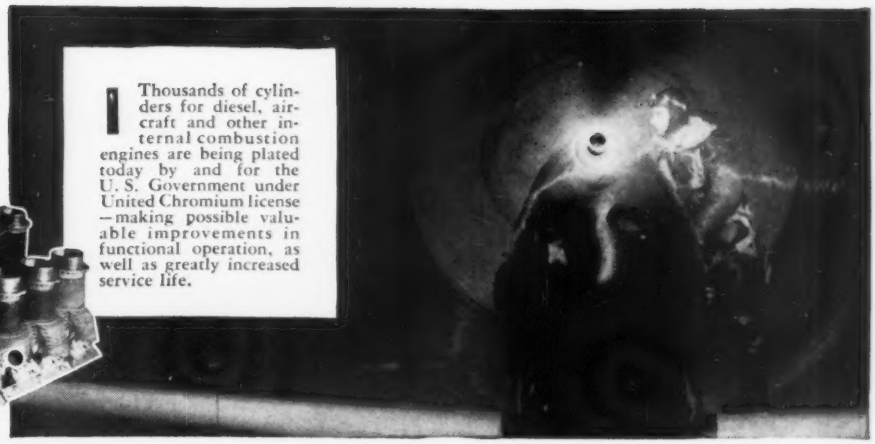
Eastern Branch: 71 West 23rd Street, New York 10, N. Y

# NEWS OF POROUS CHROMIUM

## and the Great Job it's Doing!

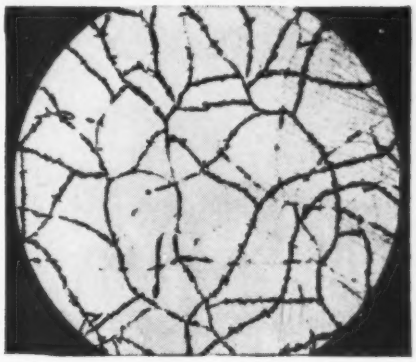
### HIGHLIGHTS OF UNITED CHROMIUM'S STORY



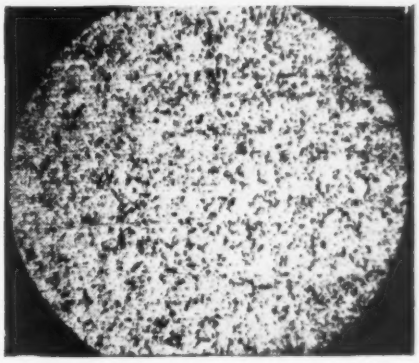


**1** Thousands of cylinders for diesel, aircraft and other internal combustion engines are being plated today by and for the U. S. Government under United Chromium license—making possible valuable improvements in functional operation, as well as greatly increased service life.

**2** A vital consideration in utilizing porous chromium to best advantage is the type of porosity best suited to the part in question. United Chromium's pioneering research in all phases of chromium plating is of particular importance in determining the most satisfactory procedure at each stage of processing.

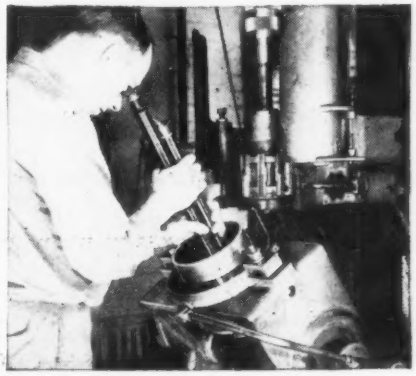


**3** Deposit of the chromium plate, for example, calls for close coordination and control of the bath composition, temperature and current density. "Channel" type porosity, shown in microphotograph above, is generally specified for aircraft cylinders.



**4** Type and degree of porosity is determined only after careful study of the conditions under which the part will operate—with respect to fuel, lubrication, cooling, etc. "Pitted" type porosity, shown in microphotograph above, is frequently found most desirable for diesel liners.

**5** The final finishing operation is important. This usually involves honing—special attention being given to the amount of plate removed, the rate of cutting and final cleaning.



**6** United Chromium assists its licensees by furnishing detailed information for each step in the procedure—from the time work is received to the final inspection.

### HOW POROUS CHROMIUM IS MADE AVAILABLE

United Chromium offers engineering and technical assistance—from specifications and layouts for equipment to analysis and maintenance of solutions—which assists our licensees to put their installations into prompt and efficient production. We will gladly furnish interested manufacturers with information as to how POROUS CHROMIUM can be adapted to their needs. In writing, please give us such pertinent information as the size and number of pieces to be plated, composition of the basis metal and the service conditions to be encountered.

# UNITED CHROMIUM, INCORPORATED

**Waterbury 90, Conn.** **51 East 42nd Street, New York 17, N. Y.** **Detroit 7, Mich.**

GENERAL ELECTRIC
Copper-Oxide Rectifiers

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"A man is known by the company he keeps"

Above we list some of the "top flight" companies for whom we are distributors. The Nankervis Company has always made it a policy to represent only those manufacturers whose integrity and products measure up to our own high standard of performance and quality.

The Nankervis Company is well equipped by long experience, equipment and engineering ability to assist you with your metal finishing requirements.

Your letter, wire or phone call will receive the prompt attention of men who thoroughly understand your problems.

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COMPLETE METAL FINISHING EQUIPMENT

# NO. S-75 GREASELESS COMPOUND

FORMAX
GREASELESS COMPOUND
For Burring — Polishing — Trimming — Breaking Sharp Corners — Removing Machine Tool Marks — For Producing Brushed or Satin Finishes.
FORMAX
THE FOUR MACS
FORMAX
THE FOUR MACS

# IS MAKING BURRING HISTORY

**For burring — polishing — breaking sharp corners — removing machine tool marks — for producing satin finishes — eliminates set up polishing wheels in the finer grain sizes.**

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Formax "S" series of Greaseless Compounds are immediately available in all grits.

## FORMAX MANUFACTURING CO.

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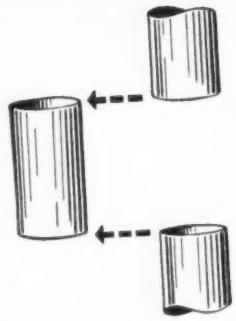
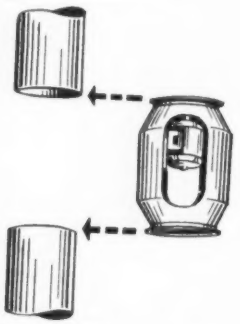
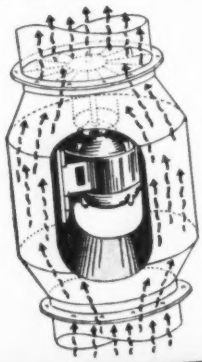
## MADE EASY . . . TROUBLE-FREE



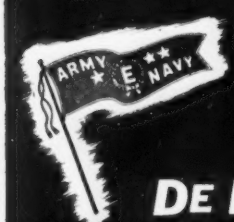
**1.** OUT COMES A SECTION OF DUCT OR STACK.



**2.** IN GOES A **BIFURCATOR.** NO PLATFORMS OR SUPPORTS NEEDED.



**3.** MOTOR IS **NOT** EXPOSED TO FUMES. AIR STREAM IS BY-PASSED AROUND ISOLATED MOTOR CHAMBER. AXIAL-FLO FAN WITH NON-OVERLOAD CHARACTERISTIC PROTECTS MOTOR AGAINST FAILURE.




*NOW GET THE WHOLE STORY*

—on these efficient exhaust units. Write today for FREE Bulletin.

## DE BOTHEZAT BIFURCATORS

De Bothezat Fans Division

AMERICAN MACHINE and METALS, INC., EAST MOLINE, ILL.



# ROLOCK

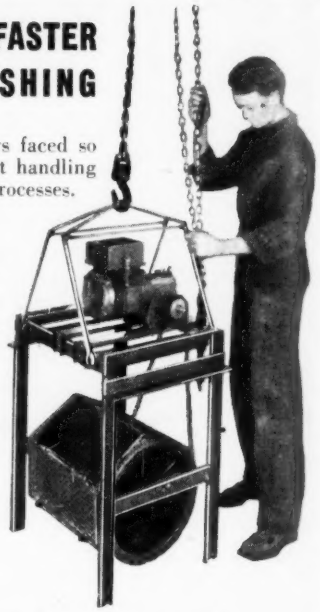
## PROCESSING CARRIERS

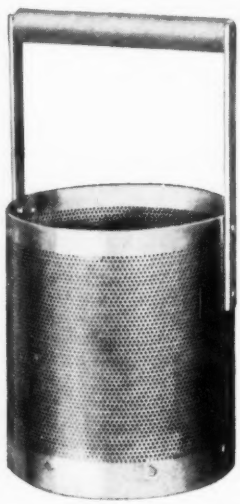
*For* **BETTER . . . FASTER METAL FINISHING**

Never before have manufacturers faced so many problems concerning efficient handling of metal parts through finishing processes.

To attain speed without sacrifice of quality is one of them. Therefore Rolock Engineers concentrate on the creation of custom-built Carriers, designed for a specific process or cycle . . . to solve this problem.

We show here three examples which have made handling easier and faster . . . helped to minimize rejects . . . lowered handling costs per load . . . added to the service life of the Carrier.





ABOVE . . . a portable motor-driven blackening basket for speedy, efficient production.

LEFT . . . a perforated dipping basket, furnished in a variety of alloys, with or without wood handle.

BELOW . . . a rack for 672 lb. load of brass discs. Separator rods allow complete and uniform pickling.

Rolock will design and build variations of these or hundreds of other Baskets, Trays, Racks, Crates or Fixtures to solve your specific problems . . . withstand all normal exposures . . . carry up to 6000 lb. loads.

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Just off the press . . . the story of Rolock Processing Carriers with 113 photographs of interesting examples of modern design . . . modern efficiency . . . 24 pages you will want to see.

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## ROLOCK, INC.

1300 Kings Highway East, Fairfield, Conn.

# Specify UDYLITE Equipment for Bulk Finishing of Small Parts

**In metal finishing equipment the name UDYLITE stands for the best. Udylite's complete line of equipment for the metal finishing plant is practical and dependable—designed by engineers who are thoroughly aware of the problems and requirements of the trade.**

**If you require specially designed equipment not found in our standard lines our experienced engineering staff will gladly help you work out the proper answer to your needs.**

**The respect for UDYLITE equipment is nationwide—the advantages of Udylite's unique "continuing service" in your own plant are worth your consideration.**

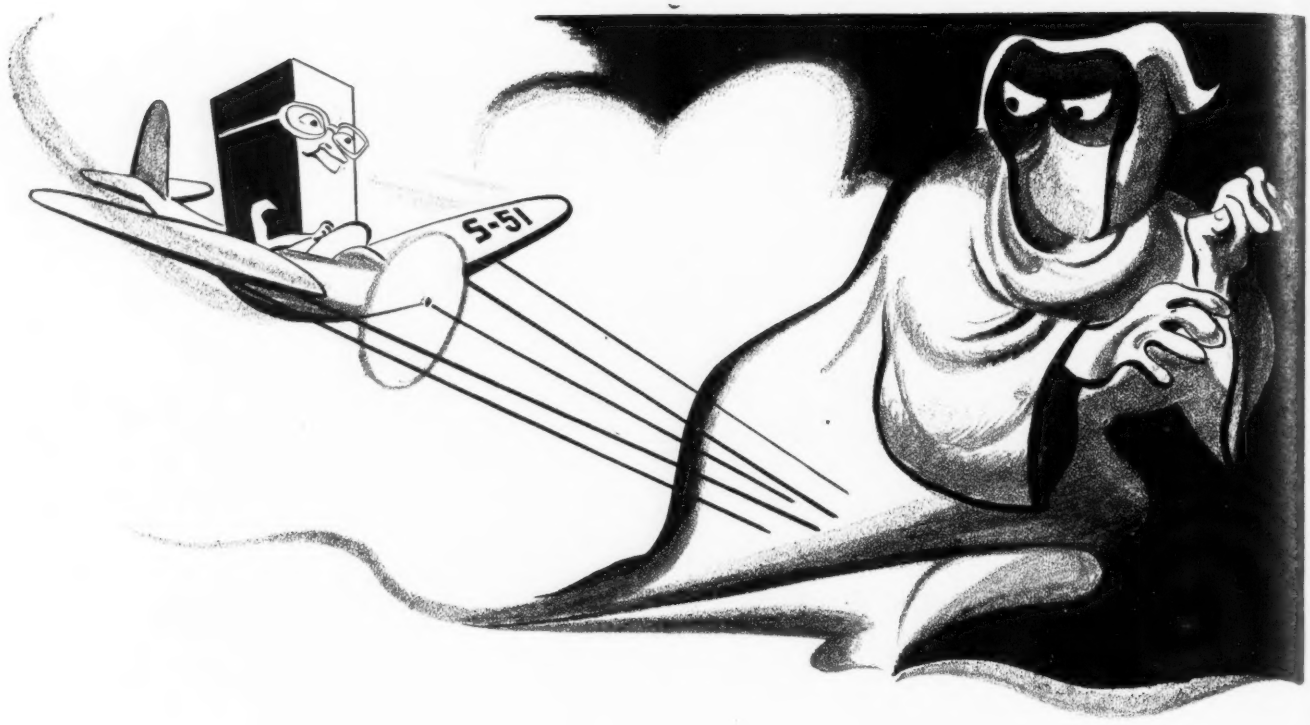
**Your inquiries are invited.**

*A. The Udylite Handiplater. B. Multiple Cylinder Horizontal Barrel. C. Udylite Automatic Barrel Plating Machine. D. Udylite Horizontal Barrel with Hoist. E. The Udylite Multi Purpose Barrel.*

## THE UDYLITE CORPORATION

**1651 East Grand Boulevard • Detroit 11, Michigan**

**Representatives in All Principal Cities**




# GHOSTS Won't Haunt Your Plating Solutions..*When you use* DARCO S-51

Adsorption is the sure and easy way to chase "ghosts"—imperceptible impurities—from your electroplating solutions. DARCO S-51 ***adsorbs*** and thus quickly removes grease, oil, soap, colloids and decomposition products that delay production and waste time, labor, solvent and metals.

DARCO is being used successfully in many kinds of electroplating—bright nickel, cyanide zinc, cadmium, iron, copper, silver, gold—because it keeps impurities from contaminating the bath and thus helps produce high quality plating. DARCO S-51 purifies at low cost, too, since a dime's worth keeps 100 gallons of solution clean for a week.

Use DARCO in your own plant. See how it helps increase production, reduce rejects and cut costs. Ask your dealer to supply you, or write us for a sample. Also, our engineers will gladly help, if you have a tough purification problem.

*This trademark identifies the genuine. Accept no packages without it.*

DARCO

DARCO—REG. U. S. PAT. OFF.

# DARCO CORPORATION

**60 East 42nd Street, New York 17, N. Y.**

**Is Your Plating Bath as Clean as the Water Used in Your Final Rinse?**

# PENNSALT CLEANER

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## HELPS INDUSTRY RECLAIM STEEL DRUMS

### CUTTING CLEANING COSTS 33⅓%

MANY MANUFACTURERS are faced with the urgent wartime necessity of reclaiming and re-using metal containers. The demand is for a cleaner that will do a *thorough* job—do it *fast*—and keep costs *down*.

A prominent oil refiner found the answer in a Pennsalt Cleaner.

The problem was to remove various types of oil, grease and solvents from steel drums—and to strip paint from these containers. The operation was carried on continuously in a 1000-gallon drum washer at 145 to 155 degrees Fahrenheit.

Several kinds of commercial cleaners had been tried previously, but cleaning was not satisfactory, rejects ran too high and costs were out of line. The method in practice was the use of an initial charge of 400 pounds of cleaning compound, followed later by an additional 300 pounds.

The Pennsalt representative was able to improve greatly on this with the correct type of Pennsalt Cleaner. The amount required was only about 35% of the previous cleaner. The cleaning action was highly effective—the drums dried faster—and grease containers could be included in the cleaning operation, an advantage not previously possible.

What's more—*careful comparison of costs showed that Pennsalt Cleaner was saving this plant 33⅓ percent!*

That's a saving that should interest you, if your plant has a metal cleaning problem. Let our experienced technical staff show *you* how a Pennsalt Cleaner will help you get better results at lower costs. Or write fully to our Special Chemicals Division. Dept. MF.

SPECIAL CHEMICALS DIVISION

**PENNSYLVANIA SALT MANUFACTURING COMPANY**

*Chemicals*

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## *Make*

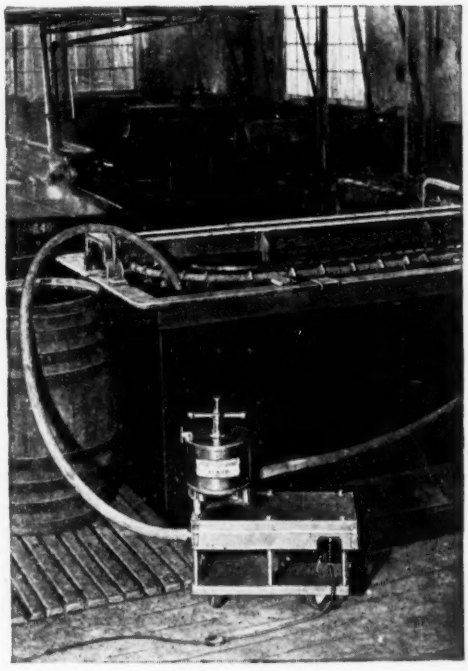
# Plating Solutions Clean

*The difference between "Sealed Disc" filtration and none, is shown in pieces at left.*

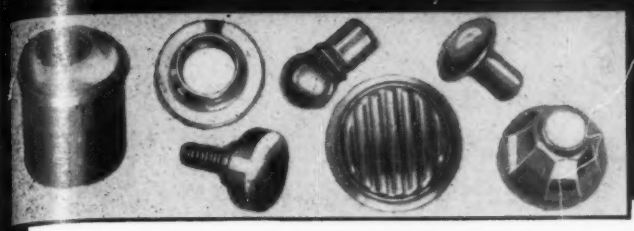
Every plating man knows this to be true and he also knows that clean plating solutions mean finer finishes, fewer rejects to be done over again. This low cost filtration pays real dividends.

Alsop "Sealed Disc" Filters are made in portable types for all capacities. Also for all kinds of liquids, Water, Acids, Chemicals, special types for all Oils, etc.

*Learn all about this remarkable form of filtration. We'll send our book. You drop us a card.*



**ALSOP ENGINEERING CORP.**
**41 Bright Street** **Milldale, Conn.**



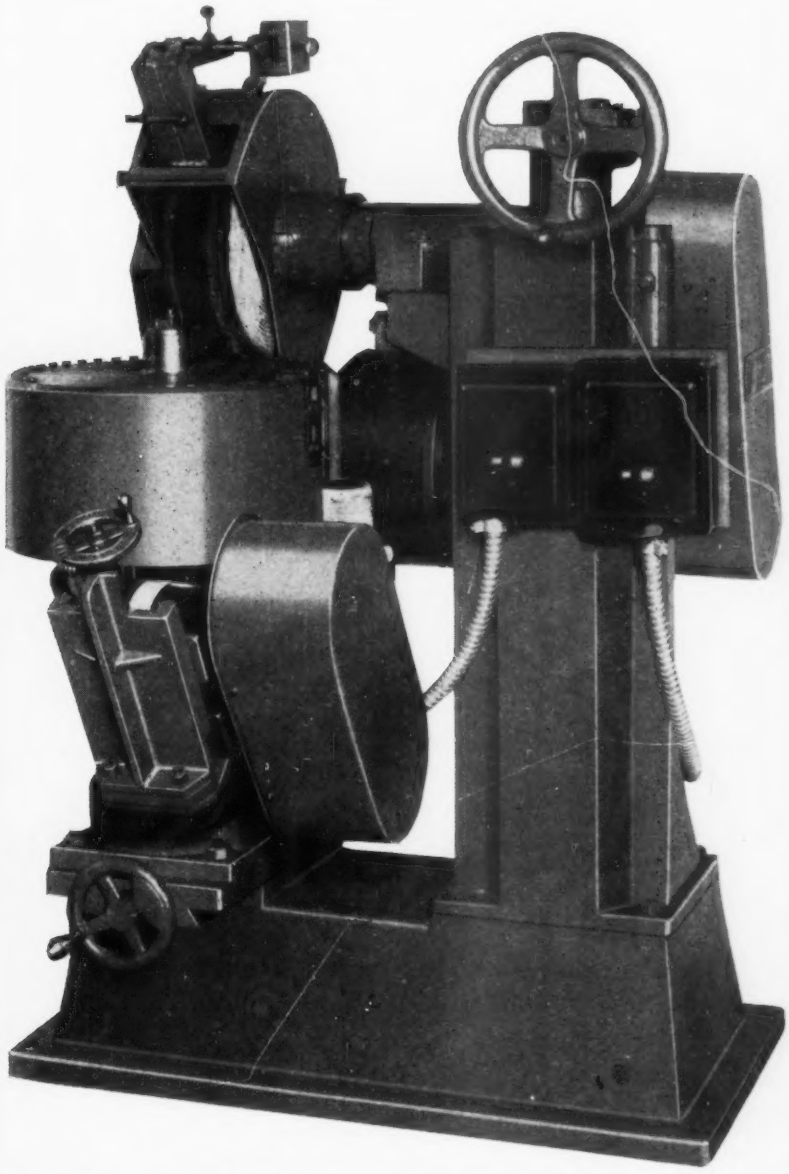
# ACME *Automatics*

## *for*

## POLISHING..
## BUFFING.....
## WIRE
## BRUSHING..
## BURRING

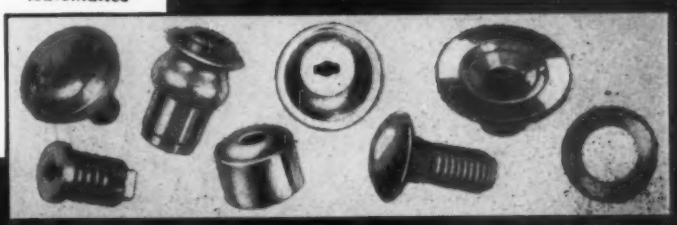
*EXTENSIVELY USED IN Wartime!*

*EQUALLY ESSENTIAL IN Peacetime!*



*One of many types of Acme Automatics*

THE new peaks in efficiency attained by the new types of Acme Automatics especially designed for wartime production will make postwar Automatics a more important factor than ever before in the lowering of production costs. Keep this in mind when you get the "go" signal to convert your plant to peacetime pursuits.



# ACME *Manufacturing Co.*

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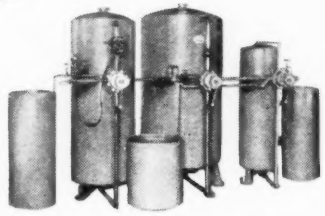
*Builders* OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 25 YEARS

# pure water for plating...

AT A FRACTION OF FORMER COSTS!

Better products, at lower unit cost, are produced when mineral salts in the water supply are eliminated from your plating solutions and rinse tanks! ILLCO-WAY De-ionizing Units, daily producing pure water to meet exacting industrial and technical standards, are helping win the war in many of the leading plating plants as well as in several hundred industrial and chemical manufacturing companies. Cost of the treated water is remarkably low—*only a few cents per thousand gallons!* Precious metals now being washed away in solution can be reclaimed with similar ILLCO equipment. Send for literature today!



TESTED IN THE LABORATORY · ILLCO-WAY · PROVED IN THE FIELD

**DE-IONIZED WATER**
*replaces* Distilled Water

Typical ILLCO-WAY unit shown above: installation in a prominent industrial plant; 1,700 gallons per hour. Other installed units have permissible flow rates of from 10 to 50,000 gallons per hour... Modern method is based on ion-exchange. Note that no heat is used, no fuel required ... Send for literature today!

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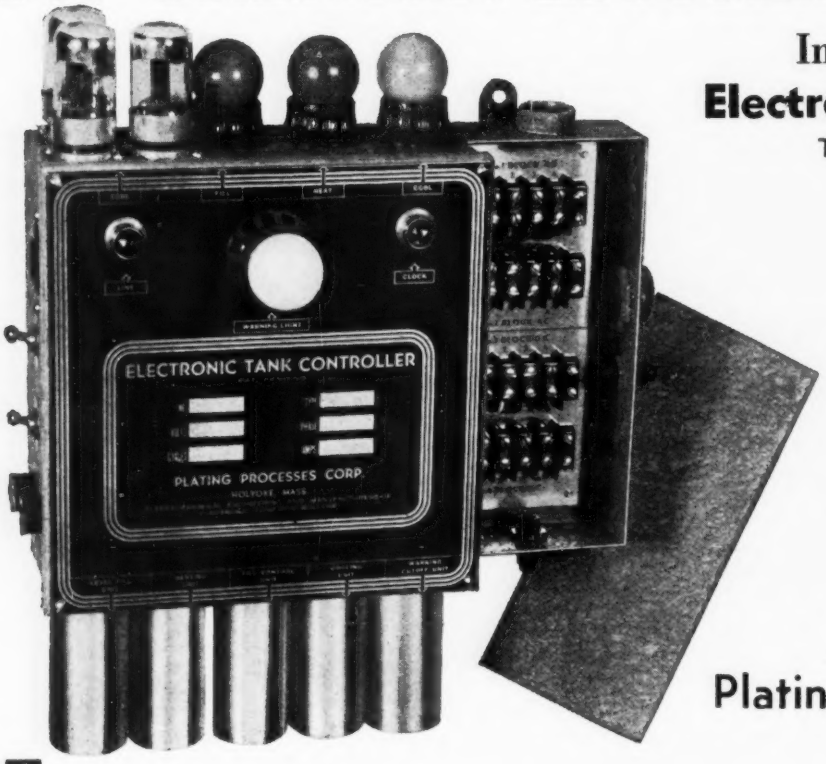
*Water Treatment Engineers*
856-12 CEDAR STREET · ROCKFORD, ILLINOIS

# For GREATER EFFICIENCY in Plating




## Install This Complete
## Electronic Tank Controller

Temperature—Level—High Level

### Some of the Users

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**Delco-Remy Div.**
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## Plating Processes Corporation
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# K–207

FOR BUFFING
STAINLESS STEEL
OR PLASTIC

THE BUCKINGHAM PRODUCTS CO.
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BUFFED WHEN
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"THE TREND IS TO PENTRATE"

As designers turn toward consumer merchandise — the trend is to Pentrate. Dependable results on huge quantities of war materials has gained a positive place for Pentrate black in the steel finishing field. It's appearance, rust resisting and friction reducing qualities will meet the demands of post-war products.

Send for free Pentrate catalog.

**HEATBATH CORPORATION**
**SPRINGFIELD • 1 • MASSACHUSETTS**

*Fabricated from Monel sheet and equipped with Monel shaft, this pickling unit weighs 800 pounds, will handle 500-1000 pound load. Photo courtesy of Rolock, Inc.*

# TAKES THE WALLOP AND WEAR ...in thorough pickling of small parts

This rotating barrel provides rapid, uniform small parts pickling... *and stands up in service.*

Designed and constructed by Rolock, Inc., Fairfield, Conn., the barrel measures 36″ in depth across the octagonal flats, 24″ in width and is made of 3/16″ Monel sheet, perforated by ¾″-diameter holes on 1½″ staggered centers.

In use, the frame is set upon the pickling tank's edge, the octagonal barrel extending into the solution. Not shown in the photo is the gear motor which will later be mounted on the frame to turn the barrel and speed pickling.

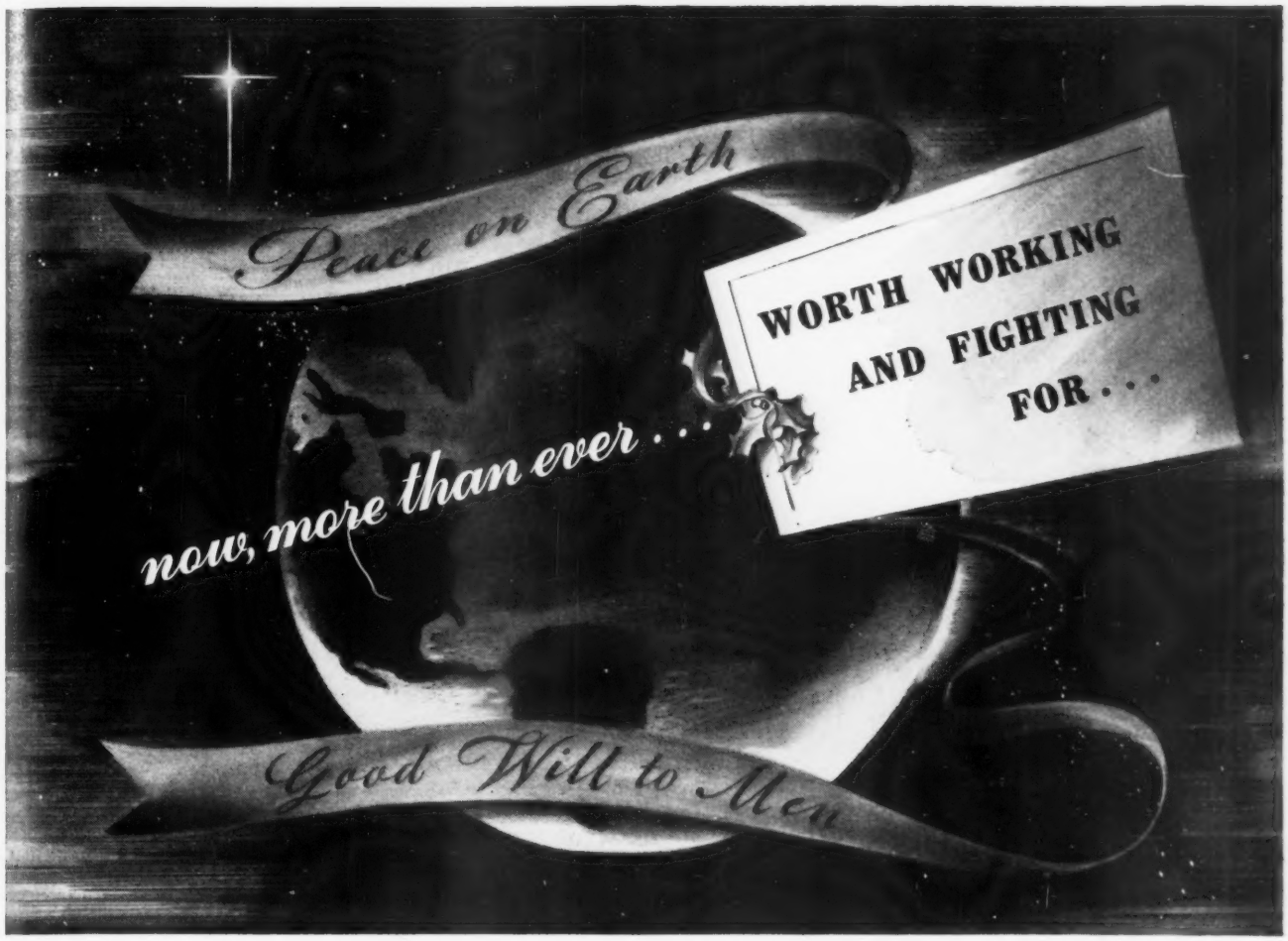
Rugged, erosion and corrosion resistant Monel is the logical metal for equipment of this type. It withstands attack by hot sulfuric acid and other pickling solutions with the exception of nitric acid.

Standard mill forms can be used in construction of equipment to meet most needs. Monel is readily fabricated. Welds retain the strength, toughness and high resistance to corrosion of the parent metal.

Important, too, is Monel's tensile strength of 75-110,000 psi. Thus heavier loads are possible with equipment made of lighter sections. By reducing *dead* weight, Monel increases the *effective carrying load* of your equipment.

**Monel**

**THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK 5, N. Y.**




NOW, perhaps more than any time in the history of mankind, do we realize the importance of the spiritual ties that bind us to our fellow men. Now must the light of our Faith shine forth as never before . . strong . . fervent . . staunch and true ☆ Let our Faith bring Light and Hope where there is sickness and despair. Let it bind and heal the wounds of a world tortured and sickened by war and pain ☆ Let our Faith give us the courage and fortitude to work on and fight on to preserve for ourselves and the less fortunate peoples of the world the Four Freedoms to which this nation has dedicated her might ☆ For in the strength of our Faith and Determination lie the Hope of the World for Peace on Earth, Good Will to Men.

*Good Friends . . . to you we extend bright hopes and most cordial Season's Greetings*

**McAleer**
**MANUFACTURING CO.**

*Manufacturers of Quality Controlled Finishing Materials*

**ROCHESTER, MICHIGAN**

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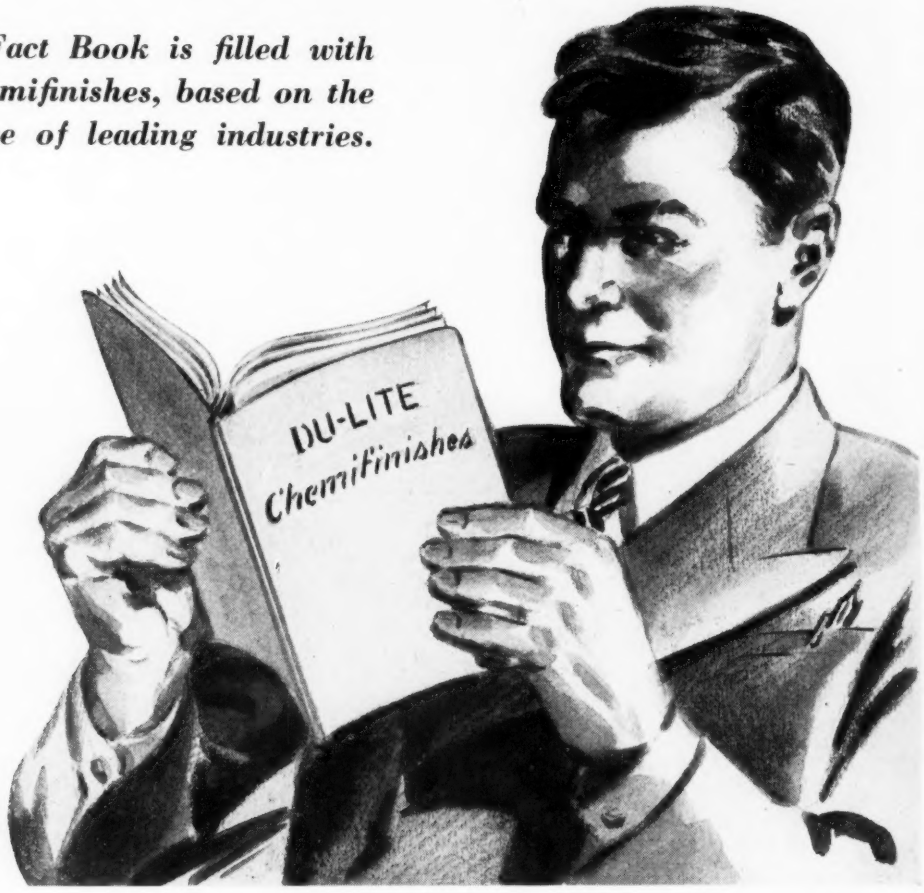
# MODERN FINISHES FOR YOUR PRODUCT

*The new Du-Lite Fact Book is filled with information on Chemifinishes, based on the war time experience of leading industries.*




## WOULD YOU SPEND 15 MINUTES TO IMPROVE YOUR Post-War Product? THEN GET THE FACTS ABOUT DU-LITE *Chemifinishes for* STEEL - BRASS - COPPER - ZINC

Every manufacturer of metal products faces the problem of what to do about finishes when he gets into the post-war period. Competition will be of the keenest and modern finishes will play a large part in the acceptability and attractiveness of finished metal products.

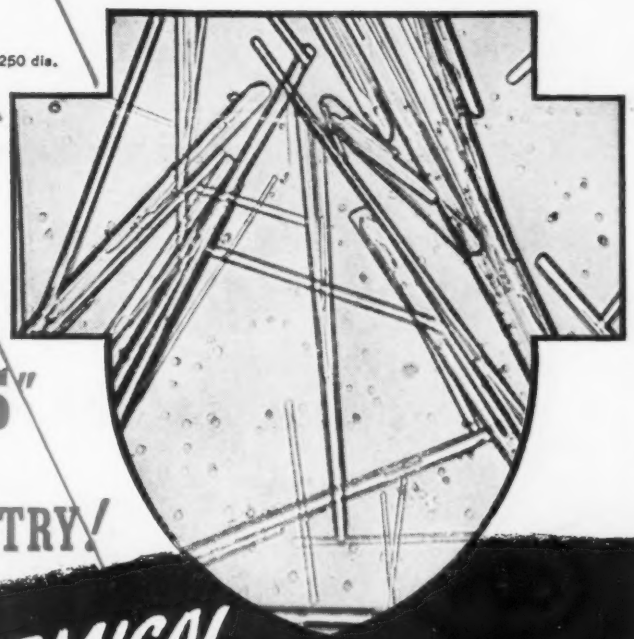
Color will mean a lot in finishes, but durability, rust resistance and cost will always be a deciding factor in the practical choice of finishes for thousands of items.

The new Du-Lite Fact Book is filled with helpful information based on the actual experience of finishing experts. It tells you frankly and clearly what to expect of black finishes for Steel, Brass, Copper and Zinc. It is a practical handbook for the superintendent and foreman of your finishing division.

A copy will be mailed to you without charge, or to any person in your organization on request. As the edition is restricted, better write promptly.

**DU-LITE CHEMICAL CORP.**
**MIDDLETOWN, CONNECTICUT**

# NEW CHEMICAL "TOOLS" FOR AMERICAN INDUSTRY!



Growing crystals of lead fluoborate—250 dia.

**METAL FLUOBORATES**

- Cadmium Fluoborate
- Chromium Fluoborate
- Copper Fluoborate
- Ferrous (Iron) Fluoborate
- Indium Fluoborate
- Lead Fluoborate
- Nickel Fluoborate
- Silver Fluoborate
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# GENERAL CHEMICAL METAL FLUOBORATES

Many important products have been developed out of General Chemical's progressive research in fluorides. *Today*—its Metal Fluoborates command considerable attention as new chemical "tools" for electroplaters and metallurgists. *Tomorrow*—the unique properties of these versatile chemical compounds suggest many potential uses whose development is both a challenge and a promise of rich reward to research and industrial chemists interested in electrolytic and metallurgical processes.

ELECTROPLATING – Metal Fluoborates are supplied in a concentrated solution form. They require no time to dissolve and dilute quickly with water to the required plating strength! Laboratory tests and commercial applications indicate that the Metal Fluoborates have other outstanding advantages for electroplating, such as high anode and cathode efficiency, good conductivity, high concentration and ease of operation at room temperature.

At present there is a widespread acceptance of lead fluoborate plating baths and an ever-growing use of lead-tin, tin, zinc, cadmium, indium, copper and other Metal Fluoborate solutions.

METALLURGY – Magnesium and aluminum casting has opened a field where alkali fluoborate salts are extremely important. All these salts may find acceptance as fluxes for welding and soldering such metals as silver, gold, stainless steel, nickel, etc. Their further use by metallurgists for heat treating, hardening and other processes can be expected with new developments in the light metal field.

Indium and Lead Fluoborate Give Airplane Bearings Longer-Wearing Surfaces.

Metal Fluoborates Efficient in Barrel Plating, too.

Alkali Fluoborates Important in Magnesium and Aluminum Casting.

JUST RELEASED!

Important new research data on General Chemical Metal Fluoborates. Includes plating with Lead, Tin, Zinc and Cadmium Fluoborate, etc. Ask for Technical Service Bulletin No. 1015-A.

Copies on request from: Nearest Technical Service Office or General Chemical Company, Fluorine Division, 40 Rector Street, New York 6, N. Y.

GENERAL CHEMICAL COMPANY

...FIRST IN FLUORIDES

## GENERAL CHEMICAL COMPANY

40 RECTOR STREET, NEW YORK 6, N. Y.

*Technical Service Offices:* Atlanta • Baltimore • Boston Bridgeport (Conn.) • Buffalo • Charlotte (N. C.) • Chicago Cleveland • Denver • Detroit • Houston • Kalamazoo (Mich.) Kansas City • Milwaukee • Minneapolis • New York Philadelphia • Pittsburgh • Providence (R. I.) • St. Louis Utica (N. Y.) • *Pacific Coast Technical Service Offices:* Los Angeles • San Francisco • Seattle, Wenatchee, Yakima (Wash.)

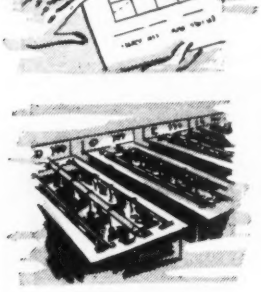
In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

## Joe the Job Plater Says:

**PLATING PROFITS were my proof of Top Performance by**

# HARSHAW ANODES & CHEMICALS

## my balance sheet reveals the facts



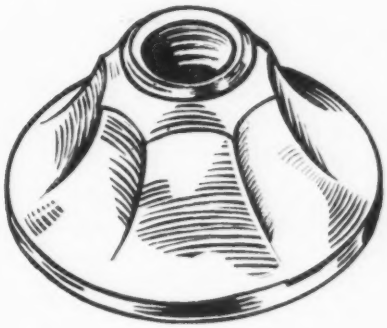
• Joe is not the only Job Plater who knows his profit and loss statement substantiates top plating performances by Harshaw Anodes and Chemicals. • In the opinion of experienced platers, the profit and loss test is the real "proof of product". Improved quality and fewer rejects make the profit column go up when Harshaw Anodes and Chemicals are used. • When making plans for electroplating and for continuous flow production, remember, the cost sheet is an irrefutable record of plating production performance. • Order Harshaw Anodes and Chemicals with confidence. The cumulative field experience of Harshaw Plating Engineers, combined with continuous laboratory checking and testing, will support your decision when the annual income and expense statement is compiled.

**SEND FOR**

- Lead Plating Booklet of Pratical Information
- 32 page book listing Industrial Chemicals
- 72 page price list of Laboratory Chemicals

HARSHAW

THE HARSHAW CHEMICAL CO.
1945 East 97th Street, Cleveland 6, Ohio
BRANCHES IN PRINCIPAL CITIES



## WHATEVER SHAPE THEY'RE IN
## They come clean with WYANDOTTE

Wyandotte metal cleaners take jobs as they come. They're bringing speed and economy to all sorts of metal-cleaning operations in all kinds of industries because they're experts at making metal surfaces *right* for the next process.

There is a Wyandotte product for every metal-cleaning need—for cleaning after machining and prior to plating, painting, lacquering, blackening, anodizing or spot welding. And the Wyandotte Field Engineer will help you apply them to your particular operation.

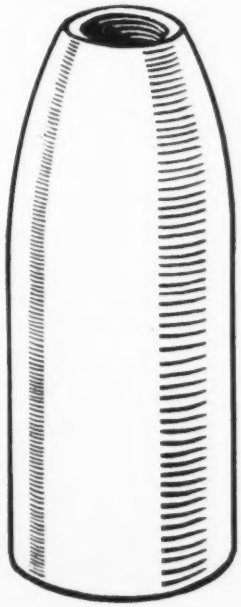
You can have his specialized help, too, in devising new cleaning methods for new processes. He's backed by the extensive Wyandotte technical service, and if he doesn't have the answer to your problem at his finger tips, he can usually get it right away.

You'll find his advice especially helpful in these days of change-overs, new materials and new processes. Get in touch with the Wyandotte Field Engineer today.

**Wyandotte**

*Reg. U. S. Pat. Off.*

WYANDOTTE CHEMICALS CORPORATION · J. B. Ford Division
Wyandotte, Michigan



**WHO'S WHO-**

IN YOUR ORGANIZATION WHEN IT COMES TO

## Metal Finishing?

Whatever his product may be, he will profit much by remembering these facts about

# BLACK-MAGIC

It's an improved oxide process that imparts a rich, deep black that won't rub off.

It's easy to work. The one-bath process for all steels except stainless operates at 300° F.

It penetrates .0001". Adding nothing to the size, it is excellent for processing gages, which can then be safely used until bright metal shows. (Pat. No. 2,355,-007.)

It is a reliable bond for paint, lacquer, enamel.

There are also fast-working Black-Magic baths for copper, zinc, brass and cadmium. Ideal for zinc base die castings, thin sheet fabrications and zinc plate. Non-priority and ordnance approved. Samples on request.

★

**SILCO**

NEW GLASS-BASE FINISH FOR STEEL & BRASS

Extremely resistant to corrosion, abrasion, impact. Stands heat up to 1000° F., making it the perfect protection for exhaust manifolds, stove linings, strip heaters, etc. It's also an improved ornamental finish for cameras, typewriters and instruments. Inert to mild alkalis and most acids, resists salt spray indefinitely. In black, white and colors. Non-priority. Tests JQD515, QM Dept. Samples on request.

**BLACK-MAGIC BLACKING SALTS for STEEL, IRON COPPER, ZINC CADMIUM**

•

**WITCH-DIP WITCH-OIL FINAL FINISHES**

•

**SILCO PROTECTIVE COATING**

•

**Cleaners Wetting Agents Acid Inhibitors Heat Treating Salts**

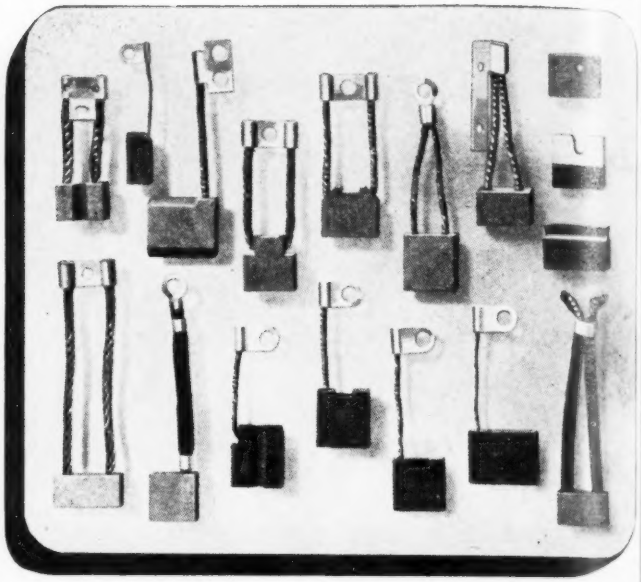
•

## MITCHELL-BRADFORD CHEMICAL COMPANY

MODERN METAL FINISHES

**[illegible] Main St., Stratford P. O., BRIDGEPORT, CONN.**





# JOB RATED BRUSHES MEAN BETTER COMMUTATION

Like motors and generators — brushes too must be designed with variations in construction in order to obtain maximum performance from commutating equipment. Matching brushes to machines is a specialty at Speer. For nearly 50 years we have been helping manufacturers and users of motors, generators and other commutating equipment find the right solution to current collecting problems. So when it comes to selecting the proper brushes for any requirements or solving commutation problems, you can come to Speer with assurance of getting sound practical advice plus quality brushes that will match your needs.

In addition to a wide variety of standard brushes, special brushes as illustrated are developed to meet the needs of various types of equipment.

To obtain prompt service, send for Brush Data Forms—one for each machine on which you have a problem. Just fill in the required information—return and we will gladly submit our recommendation.

**SPEER CARBON COMPANY**

SCC

ST. MARYS, PA.
CHICAGO · CLEVELAND · DETROIT
MILWAUKEE · NEW YORK · PITTSBURGH

6531

# The Electric Products Co.

## MOTOR-GENERATORS

***For Electro-Plating and Anodizing . . .***

**Insure:— BEST PLATING RESULTS — LOWEST POWER COSTS - - -**

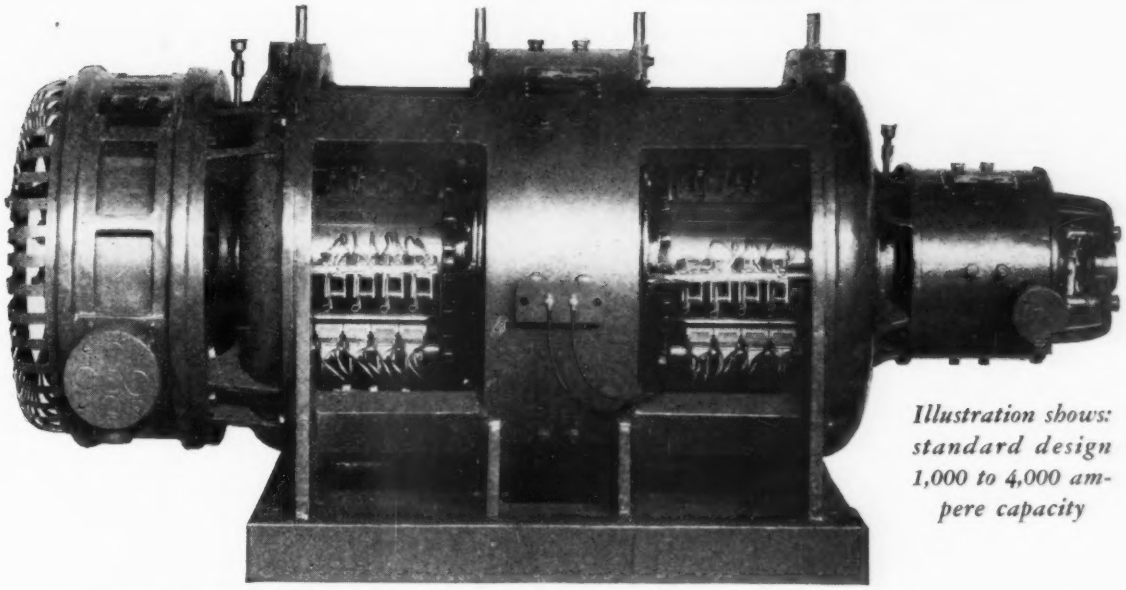


*Illustration shows: standard design 1,000 to 4,000 ampere capacity*

### - - - LOWEST MAINTENANCE COSTS - - - - -

AS THE electrolytic generator is the heart of any successful electroplating operation it must have the inherent characteristics to insure a constant control of ampere densities—

The "ELECTRIC PRODUCTS" MOTOR-GENERATOR through constant voltage at all loads provides the most scientific method for controlling ampere densities, thus insuring an absolutely uniform thickness of deposit on the plated surface and a fine lasting finish.

And as controlled ampere density means controlled electroplating costs the Electric Products Motor Generator materially reduces costs and the time required to complete the work.

Some of the inherent characteristics of the Generator that insure highest efficiency in Electro-Plating and Anodizing are:—

- Its superior ALL WELDED mechanical construction that provides an unusual rigidity and compactness possible in no other design.
- Two heavy duty-anti-friction ball bearings mounted in heavy cast brackets, telescoping into the frame. This construction insures equal air gap clearance and thereby uniform performance throughout the life of the equipment.
- Specially designed, slow speed synchronous driving motors.
- Direct connected exciters.
- Non-corrosive bronze brush holders with bronze springs.
- Undercut mica commutators that improve the efficiency of the Motor-Generator set and increase brush life.

***For complete details of these and other Electric Products generator features write for Bulletin No. 92.***

# The Electric Products Co.

**1737 CLARKSTONE ROAD • CLEVELAND 12, OHIO**

THE Puritan MANUFACTURING COMPANY
WATERBURY, CONNECTICUT

*Start with a Good Finish*

**PRIOR TO HARD CHROME PLATING**

**You can cut and color in one operation when you use the new PURICO ✳550 composition. PURICO ✳550 is a comparatively dry bar-form compound that has been especially created in answer to this need which will not leave excessive grease and will reduce operating costs through its double duty.**

NATIONAL DISTRIBUTORS

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| L. H. BUTCHER CO. | Los Angeles |
| JACOB HAY COMPANY | Chicago |
| SESSIONS-GIFFORD CO. | Providence |
| W. D. FORBES | Minneapolis |

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

# NU-WHITE *offers*

SAVINGS in both Manpower and precious Time . . . by using a unit with OUTSTANDING FEATURES! Permits heavy loads . . . all conductors, tanks, rods, connections and switches have ample current carrying capacity . . . Cylinders constructed from heavy laminated bakelite are standard in all barrels.

*Write for Complete Specifications and Prices.*

**NU-WHITE PRODUCTS CO.**
2288 University Ave., St. Paul 4, Minn.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

First
BECAUSE THEY'RE
Finest

AMERICAN
MADE
Felt
POLISHING
WHEELS

"American Made" Felt Polishing Wheels are made of high grade pure wool. No loading or weighting of any character is used. The material is uniform in texture throughout the wheel. Hardness is acquired by shrinkage of wool only — the greater the shrinkage the harder the wheel. Made in any diameter, also in face widths from ½" to 6". For wider face widths, submit specifications. "American" felt wheels are made in nine degrees of hardness.

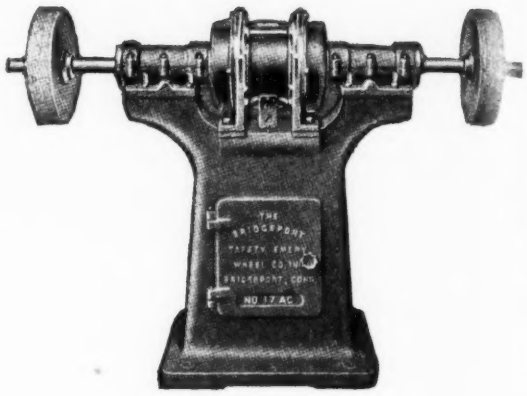
*Write, wire or phone for further information*

**AMERICAN BUFF COMPANY**
Factory & General Offices
711 WEST LAKE STREET, CHICAGO 6, ILLINOIS
Sales Offices in Principal Cities

## ----Built to handle heavy production!----

Here is a buffer that can take it and dish it out—job after job, day after day! Extremely rugged with smooth operation. Safe streamline design. Plenty of foot and swing room. Direct-connected AC motor. Speed adjustable to varied demands. High carbon steel spindles carried on four sets of ball bearings in dust-proof housings. Spindle may be rigidly locked by means of a built-in locking pin—a great help when removing wheels.

No. 17AC, shown here, is one of several "Bridgeport" motor-driven buffing lathes of high quality and advanced design. Write for complete details, stating your particular requirements.

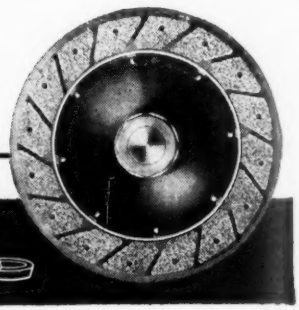


NO. 17AC
MOTOR-DRIVEN
BUFFING LATHE

THE BRIDGEPORT SAFETY EMERY WHEEL CO., INC., BRIDGEPORT, CONN., U. S. A.

# Bridgeport

GRINDERS • GRINDING WHEELS • BUFFING LATHES



## A PUMICE TO MEET EVERY NEED

Not until Valencia — the standard of American Pumice—was discovered at Grants, New Mexico, was it thought that a domestic pumice could match the quality of imported Italian Pumice. This inexhaustible deposit at Grants is true pumice stone and not a volcanic ash. It is physically and chemically equal in every respect to the now unobtainable Italian Pumice. • The Valencia plant's output of grades for every need is rigidly under control for particle size, purity, weight and color.

Check this table comparing Valencia with the highest grade of imported Italian Pumice. See for yourself that Valencia is truly the standard of American Pumice.

| | American Pulverized Per Cent | Italian Select Per Cent |
|---|---|---|
| Silica | 72.90 | 73.24 |
| Alumina | 11.28 | 10.61 |
| Iron Oxide | .86 | 1.57 |
| Titanium Oxide | .06 | .10 |
| Calcium Oxide | .80 | 1.10 |
| Magnesium Oxide | .36 | .40 |
| Soda | 3.64 | 3.03 |
| Potash | 4.38 | 5.58 |
| Sulphuric Anhydride | .03 | .05 |
| Loss on ignition | 5.20 | 4.04 |

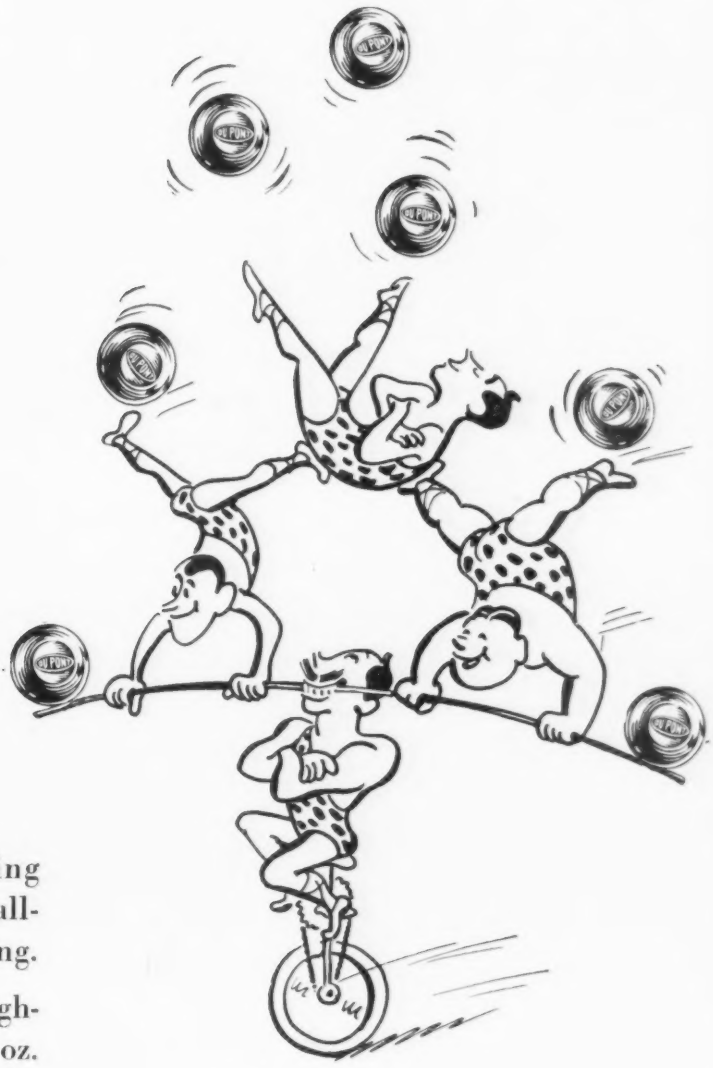
*Distributors of*
THE PUMICE CORPORATION
*of*
AMERICA
GRANTS NEW MEXICO

**WHITTAKER, CLARK & DANIELS, INC.**
260 WEST BROADWAY • NEW YORK CITY
*Warehouses: Detroit, Michigan and South Kearny, N. J.*

# YOU CAN'T MISS

when you use

# DU PONT ZINC BALL ANODES



**You'll save time and trouble** by using Du Pont Zinc Ball Anodes whenever ball-type anodes are required for zinc plating.

These Du Pont anodes are cast from highest quality zinc. Each ball weighs 1 lb., 1 oz. Each is embossed with the Du Pont oval—a feature which permits quick, positive identification. A glance tells the user that it is a zinc anode—no chance of confusing it with cadmium.

As an added convenience, Du Pont Zinc Ball Anodes are stocked in many cities throughout the country. This means quick delivery to you—no matter where you're located.

Du Pont Technical Service is ready to assist you with advice on the best use of these ball anodes and on any plating problems you may have. For more details, write, wire or telephone our nearest district office or: E. I. du Pont de Nemours & Co. (Inc.), Electroplating Division, Wilmington 98, Delaware.

DU PONT
REG. U. S. PAT. OFF.

**DU PONT CHEMICALS • PROCESSES • SERVICE**

## *for* ELECTROPLATING

**Better Things for Better Living . . . *Through Chemistry***

# "FINGERPRINTS HERE
# FINGERPRINTS THERE
# FINGERPRINTS EVERYWHERE"

Is this the "groan" song of your quality inspector when he looks at your zinc-plated parts?

Or are your surfaces still shining with original brilliance even when your customer receives your product?

They can be! With

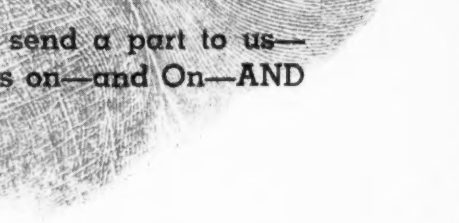
## Luster-on

LUSTER-ON is the new and simple way to obtain very bright zinc surfaces. It's a cold bath—no necessity for heating to a certain temperature—and it will not discolor in storage.

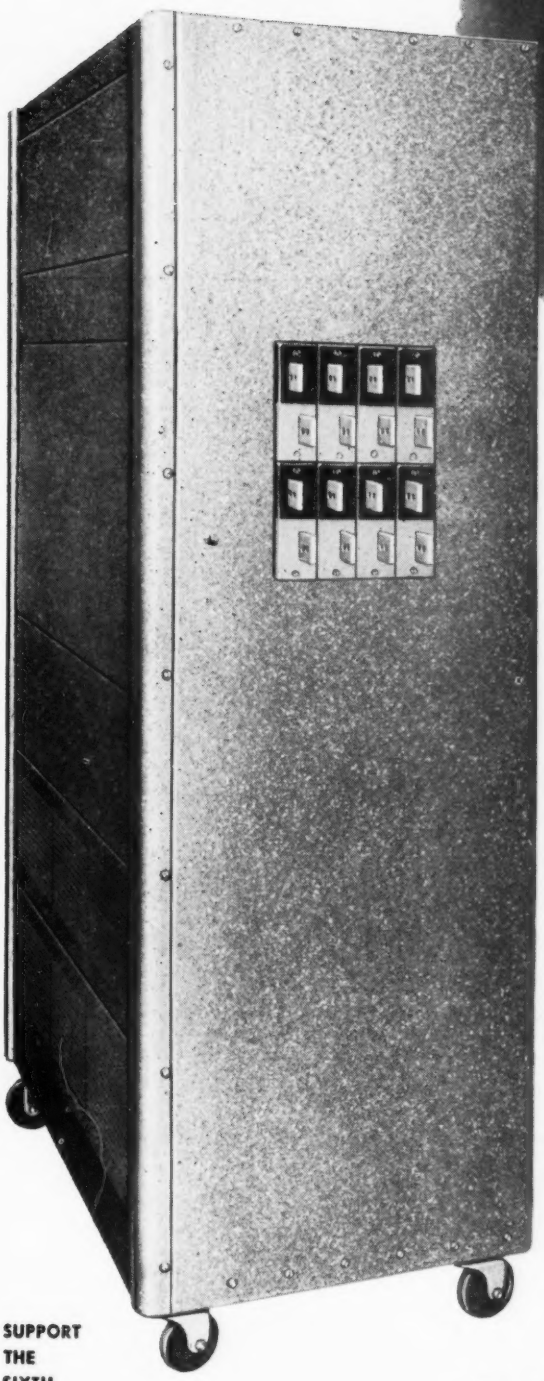
Since it's wartime—we can't send you a sample—but we can and will process one of your zinc-plated parts and ship it back to you immediately.

Nothing ventured—nothing gained—so send a part to us—and try LUSTER-ON for the lustre that stays on—and On—AND ON.

THE *Chemical*
CORPORATION
93 BROAD STREET SPRINGFIELD, 5 MASS.



# GREEN grows the RECTIFIERS



In the fertile minds of Green engineers a seed is planted, nourished, developed. And that seed ultimately bears fruit in the form of a revolutionary rectifier design. Product of a recent harvest is the Green Multi-Plater which provides, in one cabinet, *eight* separate selenium rectifier sections, each having an output capacity of 6 volts 500 amperes.

Because the sections may be used separately, grouped together for higher voltage or greater current capacity, or used in a single bank, the Multi-Plater offers a flexibility that has never before been possible. For example, if all eight sections are interconnected, any one of the following outputs may be obtained: 6 volts 4000 amperes . . . 12 volts 2000 amperes . . . 24 volts 1000 amperes . . . or 48 volts 500 amperes. Yet, this Green development is but 42″ wide, 24″ deep, approximately 81″ high . . . and occupies *floor space of only 7 square feet.*

In addition to the standard Multi-Platers which provide internal connections for operation from 220 or 440 volt 60 cycle, 3 phase supply, units for any other supply voltage can be furnished. Multi-Platers are available also with four or six rectifier sections. *Write for complete details.*

SUPPORT THE SIXTH WAR LOAN DRIVE

*"Rectifier Engineering is our Business"*

**No matter what application you may have for Direct Current, Green Rectifier Engineers will design and build equipment to your individual requirements.**

## W. GREEN ELECTRIC COMPANY, INC.

SELECTRO PLATERS AND ALL TYPES OF RECTIFIER EQUIPMENT

GREEN EXCHANGE BUILDING 130 CEDAR STREET NEW YORK 6, N. Y.

RECTIFIER G ENGINEERS

US
EQUIPMENT
SINCE 1896
For Plating, Metal Cleaning, Pickling, Acid Dipping, Drying and Allied Operations
FULLY AUTOMATIC SEMI AUTOMATIC
MANUALLY OPERATED
PLATING BARREL APPARATUS
STILL TANK PLATING EQUIPMENT
VARIABLE SPEED PLATING APPARATUS
AUTOMATIC CLEANING & PLATING UNITS
CONTINUOUS ACID TREATMENT EQUIPMENT
MECHANICAL CLEANING APPARATUS
ELECTROLYTIC PROCESSING UNITS
GENERATOR EQUIPMENT
DRYERS, ETC.
U. S. GALVANIZING & PLATING EQUIPMENT CORPORATION
Incorporated 1896
31 Heyward Street, Brooklyn, N. Y., U. S. A.

# Memo to customers

## RE: ITEMS AGAIN AVAILABLE

In reconversion to the production of peacetime goods, many of our customers will require the same finishing materials they used before the war. We assure them that now we are able to supply whatever they need of *Full Disc and Triplex Buffs; Cloth, Felt, Polishing Wheels; Acme White Finish and No Cast Lime; all grades of Tripoli and special Buffing Compositions* as well as *Rouges.*

HANSON-VAN WINKLE MUNNING CO. MATAWAN, NEW JERSEY U.S.A.

*Manufacturers of a complete line of electroplating and polishing equipment and supplies*

**HANSON-VAN WINKLE-MUNNING CO.**

**MATAWAN, NEW JERSEY**

PLANTS: Matawan, New Jersey • • Anderson, Indiana • • Bridgeport, Connecticut

SALES OFFICES: Anderson • Bridgeport • Chicago • Cleveland • Dayton • Detroit • Elkhart • Matawan Milwaukee • New Haven • New York • Philadelphia • Pittsburgh • Springfield (Mass.) • Syracuse

We can deliver promptly any quantity of *Sisalin Sections* and proper compounds for various finishing operations. These Sisalin Sections are extremely efficient in finishing work when used with Steel Rouge for one-wheel operation on moulding strip, window frame, flat iron and waffle-iron tops, toaster doors, etc., prior to plating.

To meet your present or future needs, we at plating headquarters are ready to discuss with you the latest finishes for products being redesigned or retooled—or for new products. We offer you the benefit of our 124 years experience in the metal processing industry.

*Manufacturers of a compiete line of electroplating and polishing equipment and supplies*

# HANSON-VAN WINKLE-MUNNING CO.

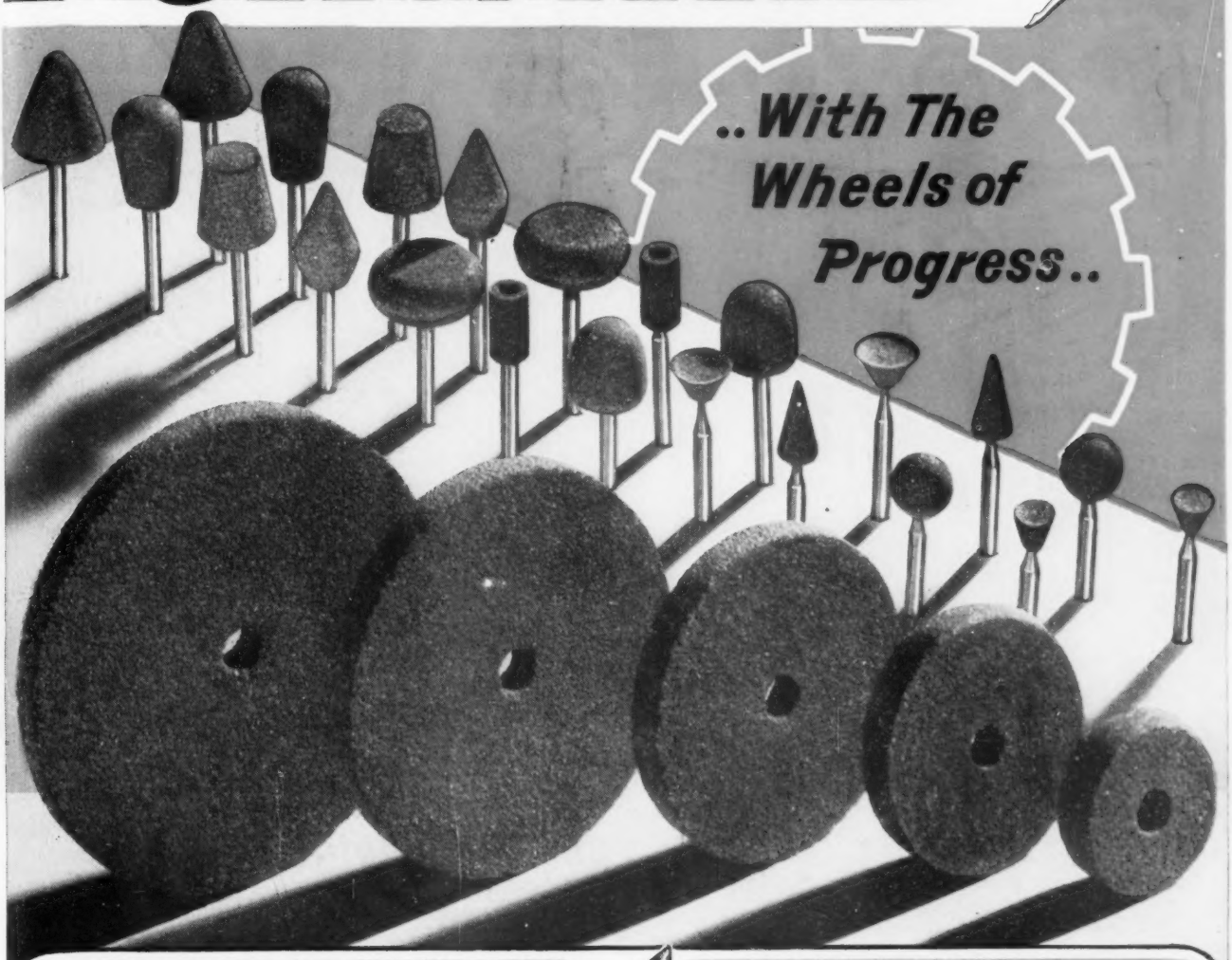
MATAWAN, NEW JERSEY

PLANTS: Matawan, New Jersey • • Anderson, Indiana • • Bridgeport, Connecticut

SALES OFFICES: Anderson • Bridgeport • Chicago • Cleveland • Dayton • Detroit • Elkhart • Matawan Milwaukee • New Haven • New York • Philadelphia • Pittsburgh • Springfield (Mass.) • Syracuse

HANSON-VAN WINKLE MUNNING · MATAWAN, NEW JERSEY

# FORWARD




## CHICAGO GRINDING WHEELS AND MOUNTED WHEELS

● Geared to the precision demands of war, Chicago Wheels have been a potent force in smashing bottlenecks—cutting down rejects—speeding production to an all-time high.

Constantly tested, constantly improved—Chicago Wheels produce finishes so perfect they pass exacting surface analyzer tests, so accurate they can be measured in micro inches.

Production of civilian goods will demand the same precision finishing methods.

Keep pace with Chicagos, the Wheels of Progress!

### CHICAGO GRINDING WHEELS

Anything up to 3" in diameter in various grains and bonds, including FV, the sensational new bond with a pedigree.

### CHICAGO MOUNTED WHEELS

Shapes and abrasive formulas to take care of every job of internal or external finishing.

### TRY ONE FREE!

So you'll know what they can do, we will send a test wheel. Tell us material you'd like to finish and size wheel required.

ARMY NAVY MOUNTED WHEELS SMALL GRINDING WHEELS

**CHICAGO WHEEL & MFG. CO.**

*Half a Century of Specialization has Established our Reputation as the Small Wheel People of the Abrasive Industry*

1101 W. Monroe St., Dept. ML, Chicago 7, Ill.

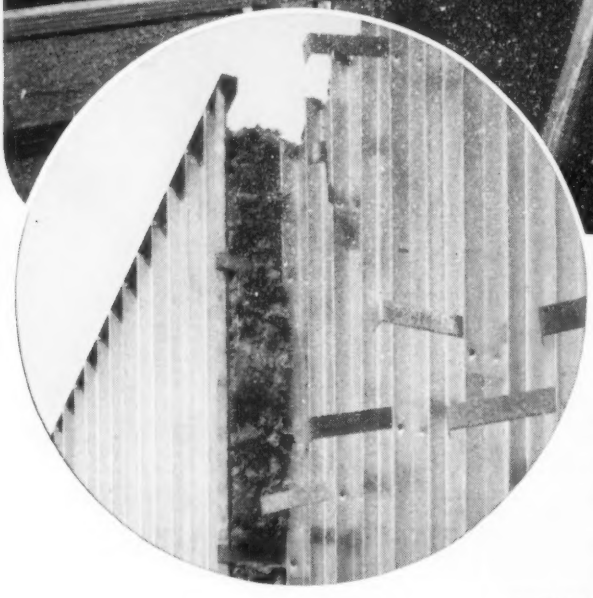
ML-12

Send Catalog. Interested in ☐ Grinding Wheels ☐ Mounted Wheels. ☐ Send Test Wheel. Size.....

Name.....

Address.....

# *Installing* OVENS ON THE ROOF...



Long experience by Mahon engineers has determined the most effective method of building and installing Roof Type Ovens. Construction is such that no additional outer housing is required. Heat does not escape due to adequate insulation and an absolute minimum of through metal from inner to outer wall. Locked ribbed-panel construction of outer wall and roof keeps weather out.

## *. . . pioneered by MAHON to SAVE valuable plant space*

**In planning rearrangement of plant facilities for their future operations, many manufacturers are locating the Drying and Baking Ovens of their FINISHING SYSTEMS in the unused space ON THE ROOF of their plants. This practice was first advanced by Mahon engineers several years ago. It has many advantages. Primarily, it releases valuable plant space for other production purposes. In addition, it eliminates restrictions in oven design caused by columns, piping, ducts, etc., which are so frequently encountered inside the plant when large scale oven installations are to be installed. At your request, Mahon engineers will make a study of your product and production and will demonstrate the advantages of Mahon Roof Type Ovens, if practical for your purpose. A survey incurs no obligation.**

THE R. C. MAHON COMPANY

DETROIT 11 — CHICAGO 4

Designers and Manufacturers of Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of All Types, Filtered Air Supply Systems, Hydro-Foam Dust Collectors—and Many Other Units of Special Production Equipment—Including Complete Finishing Systems.

FOR
**HARD CHROMIUM**
USE
**ZIALITE**
**ADDITION AGENTS**
to obtain

1. Finer grain structure
2. More durable plate
3. Smoother heavy plate
4. Greater throwing power
5. Less sensitivity to sulphate ratio.

Send a sample of your present bath to see if it is suitable for conversion to this improved formula.

**ZIALITE CORPORATION**
143 Exchange Street
Worcester, Mass.

**VULCAN**
**SODIUM**
**STANNATE**

Manufactured by

THE VULCAN DETINNING CO.
SEWAREN, N. J.

Under Patents Nos. 1,575,217 and 1,708,392

**FOR TIN**
**ELECTROPLATING**

SALES AGENT

The Electrochemicals Dept., E. I. Du Pont de Nemours & Co., Inc., Wilmington, Delaware.

Now that Platinum and Rhodium are out for the duration

**Investigate Our**

PALLITE

***Palladium***
***Plating Solution***

**PRECIMET LABORATORIES**
Division of George C. Lambros
Research & Development in Precious Metals
64 Fulton Street New York 7

*Hartford* GUARANTEED
**STEEL BALLS**
*Best for Burnishing . . . Perfect for Polishing. No culls, no cracks.*
*Mixtures as Required*
THE HARTFORD STEEL BALL CO.
HARTFORD 6, CONN.

**OXY-DYZ-ENE**
HIGHEST STRENGTH
**OXIDIZING AGENTS**
POSSIBLE TO PRODUCE
Sold in LUMP and LIQUID FORMS by Leading Plater Supply Houses
Manufactured For 68 Years By
**KREMBS & COMPANY**
669 W. OHIO ST. CHICAGO, U.S.A.

**BRASS SHEET**
Bronze and Gilding
Processed For Difficult Drawing Bright Finishes
**ROD - WIRE**
BRISTOL, CONNECTICUT
Offices:
15 Park Row NEW YORK
Hospital Trust Building PROVIDENCE R. I.

*Always Room for One More*

Your orders are always welcome here. And, regardless of size, our constant endeavor is to give them the kind of personal service and efficient handling that will keep old friends continually satisfied and bring new friends back often.

**THE ROBERTS ROUGE COMPANY**
STRATFORD, CONNECTICUT
Specialists in Manufacturing of Thoroughly Dependable Gold, Sterling and Silver Plate Rouges; Stainless Steel, Chrome and Crocus Compounds

**PUT RUST TO WORK!**

Brush or spray Nobs Glazecoat directly on rust. Rust aids in forming a permanent thermo-plastic coating that is not affected by water, alcohols, dilute acids, or alkalies. Prevents further rusting. Stands heat to 400° F. Covers about 300 sq. feet per gallon.

PRICE . . . $3.50 PER GAL. F.O.B. LOS ANGELES

**NOBS CHEMICAL COMPANY**
2465 EAST 53RD STREET, LOS ANGELES, CALIF.
Seattle San Francisco

*Try* **PLATER'S PUTTY**
**A New Stop-off or masking compound**

| *Prices* | | |
|---|---|---|
| REZISTAL "A" | 1 lb. jar | $3.00 |
| | 2 lb. jar | 5.00 |
| | 5 lb. jar | 10.00 |

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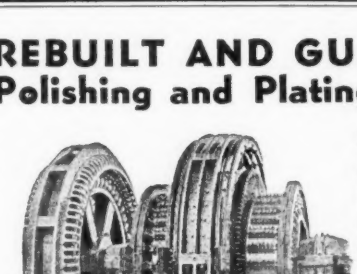

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# « « « « « INDEX TO ADVERTISERS » » » » »


**A**

Abbott Ball Co., Hartford, Conn. ..... 787
Acme Mfg. Co., Detroit, Mich. ..... 27
Agate Lacquer Mfg. Co., Long Island City, N. Y. ... 790
All-Brite Chem. Co., Waterbury, Conn. ..... 779
Alsop Engineering Corp., Milldale, Conn. ..... 26
Aluminum Industries, Inc., Cincinnati, Ohio ..... 788
American Buff Co., Chicago, Ill. ..... 39
American Chemical Paint Co., Ambler, Pa. ..... 781
American Machine & Metals Co. ..... 22
American Nickeloid Co., Peru, Ill. ..... 766
Apothecaries Hall Co., Waterbury, Conn. ..... 769

**B**

Baird Machine Co., The, Bridgeport, Conn. ..... 7, 14
Baker, M. E., Co., The, Cambridge, Mass. ..... 50
Barber-Colman Co., Rockford, Ill. ..... 766
Beam Knodel, Inc., New York ..... 50
Beckman Instruments Div. National Technical Laboratories, South Pasadena, Cal. ..... 755
Belke Mfg. Co., Chicago, Ill. ..... 759
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Conn. ..... 40
Bristol Brass Corp., The, Bristol, Conn. ..... 49
Buckingham Products Co., Detroit, Mich. ..... 29
Bullard Co., Bridgeport, Conn. ..... 754

**C**

Chemical Corp., The, Springfield, Mass. ..... 42
Chicago Wheel Mfg. Co., Chicago, Ill. ..... 793
Chromium Process Co., Shelton, Conn. ..... 49
Clinton Supply Co., Chicago, Ill. ..... 50
Codman Co., F. L. & J. C., Rockland, Mass. ..... 55
Columbia Electric Mfg. Co., Cleveland, Ohio ..... 769
Crown Rheostat & Supply Co., Chicago, Ill. ..... 763

**D**

Darco Corporation, New York, N. Y. ..... 24
Detrex Corp., Detroit, Mich. ..... Back Cover
Diversey Corp., Chicago, Ill. ..... 751
Dulite Chemicals Corp., Middletown, Conn. ..... 32
E. I. Du Pont de Nemours & Co., Wilmington, Del. ..... 41, 783

**E**

Eaton-Clark Co., Detroit, Mich. ..... 769
Electric Products Co., Cleveland, Ohio ..... 37
Enthone Co., New Haven, Conn. ..... 3, 749, 791

**F**

Formax Mfg. Co., Detroit, Mich. ..... 21

**G**

General Abrasive Co., Niagara Falls, N. Y. ..... 761
General Chem. Co., New York, N. Y. ..... 33
General Solvents Co., Rochester, N. Y. ..... 787
Globe Machine & Stamping Co., Cleveland, Ohio .. 765
Green Electric Co., W., New York, N. Y. ..... 43
Gumm Chemical Co., Inc., Frederick, Kearney, N. J. Inside Front Cover

**H**

Hamilton Emery & Carborundum Co., Chester, Mass. 766
Hammond Machinery Builders, The, Kalamazoo, Mich. ..... 18
Hanson-Van Winkle-Munning Co., Matawan, N. J. .. 47-48
Harrison & Co., Haverhill, Mass. ..... 763
Harshaw Chemical Co., The, Cleveland, Ohio ..... 34
Hartford Steel Ball, Hartford, Conn. ..... 49
Hay Co., Jacob, Chicago, Ill. ..... 764
Heatbath Corp., Springfield, Mass. ..... 29
Hinterleitner, E. J., and Associates, Westfield, N. J. 750
Hogaboom, G. B. Jr., & Co., Newark, N. J. ..... 750
Holland & Sons, Inc., Brooklyn, N. Y. ..... 50

**I**

Industrial Filter & Pump Mfg. Co., Chicago, Ill. .... 15
International Nickel Co., Inc., New York, N. Y. ..... 30
International Rustproof Corp., Cleveland, Ohio .... 789
Illinois Water Treatment Co., Rockford, Ill. ..... 28

**J**

Jensen Specialties, Inc., Detroit, Mich. ..... 785

**K**

Kelite Products, Inc., Los Angeles, Cal. ..... 10
Keystone Carbon Co., St. Marys, Pa. ..... 753
Keystone Emery Mills, Philadelphia, Pa. ..... 765
Kirk & Blum Mfg. Co., Cincinnati, Ohio ..... 8
Kocour Co., Chicago, Ill. ..... 764
Krembs & Co., Chicago, Ill. ..... 49
Kushner, Joseph, New York ..... 750

**L**

LaMotte Chemical Products, Baltimore, Md. ..... 767
Land & Co., L. J., New York ..... 51
Lasalco, Inc., St. Louis, Mo. ..... 11
Lea Mfg. Co., The, Waterbury, Conn. ..... 1
L'Hommedieu & Sons Co., Chas. F., Chicago, Ill. .. 7
Lupomatic Tumbling Machine Co., New York, N. Y. 54

**M**

Maas & Waldstein Co., Newark, N. J. ..... 774
MacDermid Incorporated, Waterbury, Conn. ..... 56-57
Magnus Chem. Co., Garwood, N. J. ..... 787, 791, 792
Magnuson Products Corp., Brooklyn, N. Y. ..... 769
Mahon Co., R. C., Detroit—Chicago ..... 794
Manderscheid Co., Chicago, Ill. ..... 6
McAleer Mfg. Co., Detroit, Mich. ..... 31
Michigan Bleach & Chem. Co., Detroit, Mich. ..... 17
Michigan Chrome & Chemical Co., Detroit, Mich... 758
Mine Safety Appliances Co., Pittsburgh, Pa. ..... 8
Mitchell Bradford Chem. Co., Bridgeport, Conn. .... 36
Motor Repair Co., Cleveland, Ohio ..... 50
Munning & Munning, Inc., Newark, N. J. ..... 767
Mutual Chemical Co. of America, New York, N. Y. 762

**N**

Nankervis Co., Geo. L., Detroit, Mich. ..... 20
National Sherardizing & Mach. Co., Hartford, Conn. 767
Nelson Chem. Co., Detroit, Mich. ..... 790
Nobs Chem. Co., Los Angeles, Cal. ..... 49
Novitsky, Jos., Hollis, L. I., N. Y. ..... 762
Nu-White Products Co., St. Paul, Minn. ..... 38

**O**

Oakite Products, Inc., New York, N. Y. ..... 4
Optimus Equipment Co., Matawan, N. J. ..... 779
Osborn Mfg. Co., Cleveland, Ohio ..... 12

**P**

Pennsylvania Salt Mfg. Co., Philadelphia, Pa. ..... 25
Photovolt Corp., New York, N. Y. ..... 791
Platers Technical Service Co., New York, N. Y. ..... 750
Plating Equipment & Supply Co., New York, N. Y. 51
Plating Processes Corp., Holyoke, Mass. ..... 28, 49
Platt Bros. & Co., Waterbury, Conn. ..... 765
Precimet Laboratories, New York, N. Y. ..... 49
Proctor & Gamble, Cincinnati, Ohio ..... 782
Puritan Mfg. Co., Waterbury, Conn. ..... 38

**Q**

Quinn Co., Nelson J., Toledo 7, Ohio ..... 759

**R**

Rheem Research Products Inc., Baltimore, Md. ..... 16
Roberts Rouge Co., Stratford, Conn. ..... 49
Robinson, A., & Sons, New York, N. Y. ..... 750
Roe Mfg. Co., Lewis, Brooklyn, N. Y. ..... 766
Rolock, Inc., Fairfield, Conn. ..... 22

**S**

Sarco Co., Inc., New York, N. Y. ..... 9
Sparkler Mfg. Co., Mundelein, Ill. ..... 776
Speer Carbon Co., St. Marys, Pa. ..... 36
Standard Plating Rack Co., Chicago, Ill. ..... 766
Stevens, Inc., Frederic, Detroit, Mich. ..... 5
Sulphur Products Co., Greensburg, Pa. ..... 767

**T**

Taber Instruments Corp., North Tonawanda, N. Y. .. 786
Tobler Chem. Co., Boston, Mass. ..... 766

**U**

Udylite Corp., The, Detroit, Mich. ..... 23
United Chromium, Inc., New York, N. Y. ..... 19, 33, 757
U. S. Galvanizing & Pltg. Equipment Corp., Brooklyn, N. Y. ..... 44

**V**

Valvoline Oil Co., Cincinnati, Ohio ..... 786
Vonnegut Moulder Corp., Indianapolis, Ind. ..... 788
Vulcan Detinning Co., The, Sewaren, N. J. ..... 49

**W**

Waterbury Rolling Mills, Inc., Waterbury, Conn. .. 765
Whittaker, Clark & Daniels, Inc., New York, N. Y. .. 40
Wrigley Co., Wm. Jr., Chicago, Ill. ..... 756
Wyandotte Chemicals Corp., F. B. Ford Division, Wyandotte, Mich. ..... 35

**Z**

Zapon Division, Atlas Powder Co., New York and Stamford, Conn., and North Chicago, Ill. ..... 772
Zialite Corp., Worcester, Mass. ..... 49



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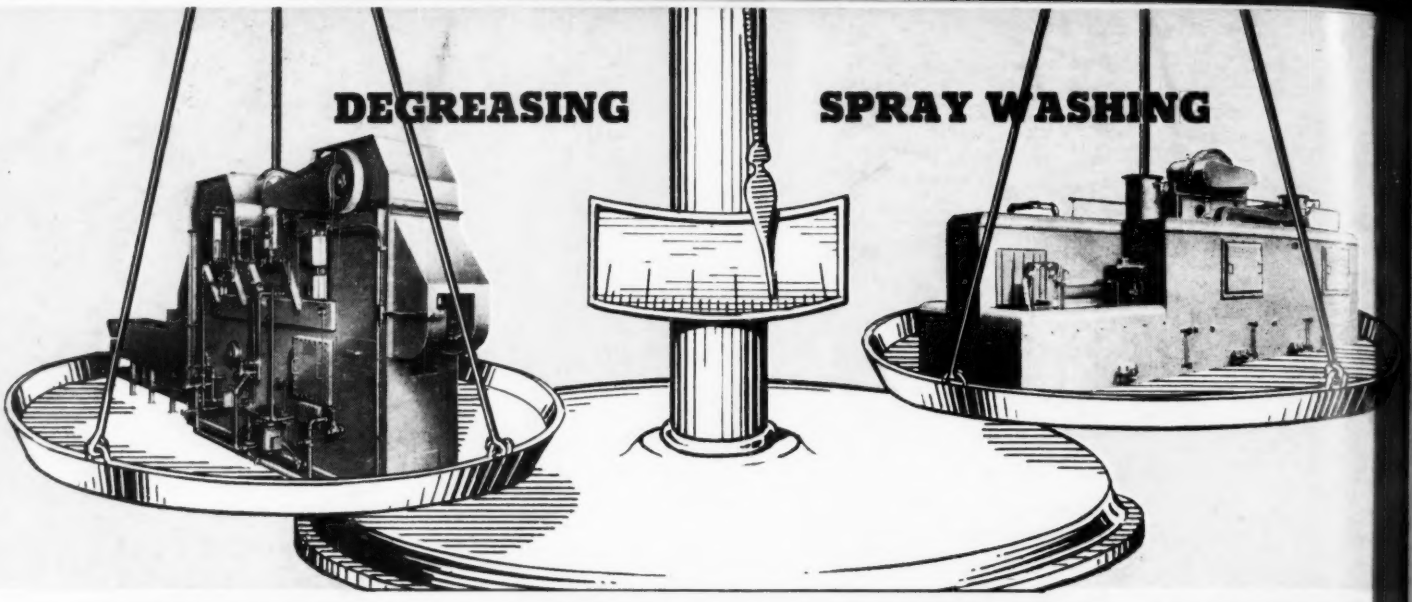


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## For Your Production

If you are considering the installation in your plant of solvent-vapor degreasing machines or washers for alkali, spirits or emulsion cleaning, a Detrex man can aid you in making your decision as to the type of equipment best suited to your needs.

Detrex is the one manufacturing source where you can go for unbiased and authoritative opinions on the relative merits of various types of metal cleaning machines and chemicals. For, not only does Detrex produce degreasers, washers and processing machines, but also supplies Perm-A-Clor and Triad degreasing solvents, and Triad Alkali Cleaning Compounds for washers, electric cleaning and soak tanks. Each has its application, and your specific requirements are our guide.

Detrex has branch offices in principal cities. Write for the name of our engineer in your locality. He will be glad to consult with you without obligation.

# DETREX CORPORATION

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